The Finnmarkian. *English translation of the French text of the book:*
Le Finnmarkien. Les origines de la civilisation dans l'extrême-nord de l'Europe
by Johs. Bøe & A. Nummedal (1936)

Translated by Allan Krill using Google translate

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THE FINNMARKIAN
THE ORIGIN OF THE CIVILIZATION IN THE EXTREME NORTH OF EUROPE
by Johs. Bøe and A. Nummedal

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FOREWORD

The archaeological finds presented in this study are the result of research carried out over ten summers in the far north of Norway. The Institute for Comparative Research in Human Culture in Oslo took the initiative and assumed all the costs for this research, which falls within its plan of study of the civilization of the Arctic peoples. The research was directed by Mr. ANDERS NUMMEDAL, assistant curator of the Prehistoric Museum of the University of Oslo. A preliminary account of the finds made in the early years was presented by A. Nummedal in the book entitled: Stone Age Finds in Finnmark (Instituttet for Sammenlignende Kulturforskning, serie B, t. XIII. Oslo 1929. See also, by the same author: Stenalderfundene i Alta. [The deposits of the Stone Age of Alta]. Norsk geologisk tidsskrift, vol. IX. Oslo 1927.)

At the International Congress of Prehistoric and Protohistoric Sciences in London in 1932, I gave a brief presentation concerning these deposits.

In total, about sixty sites have been discovered in Finnmark, and the collected artifacts form a considerable mass. After such important discoveries, one has the right to expect more than preliminary conclusions, even if it is still impossible today to provide a final solution to the problems raised by this still isolated civilization. In any case, it was necessary that these discoveries were subject to discussion, as they are in many ways a new fact in the prehistory of the north. That is why the Institute for Comparative Research in Human Culture wanted us to present a preliminary report of the deposits, and assigned me this task. My time was initially absorbed by preparatory studies and travel, so that I was only able to begin study of the artifacts in January 1935. Printing of the book began in March 1936.

This book is presented to the public as the result of the collaboration of A. Nummedal and the undersigned. It is A. Nummedal who has the

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honor and responsibility for the research carried out in the field, while the responsibility for the writing and the opinions asserted here fall solely on me. The information on the geographical and topographical setting of the deposits is due mainly to A. Nummedal, and the form that I gave to this part of the presentation was approved by him.

The civilization we are dealing with here was previously called the Komsa Civilization (Komsakultur), after the name of a mountain located in the vicinity of the first sites that were discovered. In this book we call it the *Finnmarkian*, a more characteristic term, which fits better with the international vocabulary and corresponds to the currently known extension of this civilization.

That the book could be written so quickly, and that it could be printed without delay, are above all due to the exceptional and valuable interest in this undertaking by the Institute for Comparative Research in Human Culture. With extreme generosity it covered the expenses necessary for preparatory research, study trips and additional costs of aid and replacement; finally, it took charge of printing this work in one of its publication series. I feel the most vivid and profound gratitude towards it, thinking that I have enjoyed a freedom for my work that a Norwegian scientist rarely enjoys. Let me therefore address, with my respectful homage, a personal thank you to the President of the Institute, Mr. Professor FREDRIK STANG and to Mr. Professor MAGNUS OLSEN, President of the Arctic section of the Institute, for the goodwill and active sympathy that they have always shown me. I express my respectful gratitude to the Bergen Museum and the Director of the History and Antiquities section, Mr. Professor HAAKON SHETELIG, who granted me the necessary leave, and also to Mr. Professor A. W. BRØGGER and the scientists who with him direct the Prehistoric Museum of the Universities, for the facilities of all kinds that I have obtained in the study of the artifacts of Finnmark.

I also owe a debt of gratitude to a number of foreign colleagues and scholars. And first of all I thank my learned friend Dr. R. VAUFREY, professor at the Institute of Human Paleontology, for the tireless help that I received from him during my study stay in Paris, and later in tours of my work in Norway.

I also warmly thank the abbot Mr. BREUIL, professor at the College of France and the Institute of Human Paleontology, from whom I received valuable suggestions during our conversations; Professor M. BOULE, Director of

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the Institute of Human Paleontology; Mr. R. LANTIER, curator of the Museum of National Antiquites of St. Germain-en-Laye; Count BeGOUEN, curator at the Natural History Museum of Toulouse; Professor G. SCHWANTES, director of the Provinzialmuseum in Kiel; Professor K. ABSOLON, director of the Moravian National Museum in Brno, who allowed me, with the greatest kindness, to continue studies in their institute and their collections, and many other people that it would take too long to mention.

I send a cordial greeting to Mr. JEAN LESCOFFIER, Doctor of Letters, who has assumed the delicate task of translating my manuscript into French.

Finally, I sincerely thank my helpers, M. L. SMESTAD, preparator, who photographed the artifacts, and Misses BORGHILD FRIMANNSLUND, JOHANNE NITTER and MARY WILHEMSEN, to whom the drawings inserted in the title are due.

Bergen, March 1936.

Johs. Bøe

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Map showing the geographical location of Finnmark, distinguished by a flat black tint.

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FINNMARK

The region. The archaeological exploration.

In the far north, Europe faces the Polar Sea: it is Finnmark. Even for many Norwegians, it is an infinitely distant and foreign land. Most of us probably never see it, or at most as tourists, during a walk of a few days along the coast. It is therefore very rare that we have a knowledge of it, I won't say in-depth, but almost exact. Memories of legend and saga, accounts of travelers and other readings most often leave only very confused ideas about the country itself and the conditions of life. Judgments lose all proportion and go from one extreme to another, just like travelers in their stories. Let us hear how two scientists and excellent observers recount their impressions about slightly different places on the same island. "How pleasantly surprised was I," exclaims one of them, "when I went ashore to find myself in the middle of the richest sub-alpine meadow it is possible to see!" The grass, tall and thick, came to my knees, and I found at the extremity of Europe the flowers that I had admired so often at the foot of the Swiss Alps: it was they, as vigorous, as brilliant, and greater than in their mountains." It is about Hornbukta, at the foot of the North Cape, and the author is the French botanist Charles Martin, who was part of the scientific expedition of the corvette La Recherche, in 1838−1840[1]. About thirty years previously, Magerøya had received a visit from a another scholar, the famous German geologist Leopold v. Buch. His impressions were a little different: "There are

huge rocks that surround the fiord here. But the interior, on the mountains, how sad and lonely! Everything is dead, or just show beginning of life. There are still large patches of snow in the lower parts; The high parts, on the other hand, are enormous piles of stones, covered with some mosses, with no trace of grass at all. Like a new Earth emerging from the biblical flood. Here

[1] Travels of the Northern Scientific Commission, in Scandinavia, Lapland, Spitsbergen and the Faroe Islands during the years 1838, 1839 and 1840 on the corvette La Recherche, commanded by Mr. Fabvre, lieutenant. Public by order of the King under the direction of Mr. Paul Gaimard, president of the Northern Scientific Commission. Volume II, first part, p. 263.

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Nature never wakes up, and one wants to flee these solitudes"[1]. Now these lines were written in the month of July (1807), in the best season there is in Finnmark. And von Buch was not a gloomy spirit, as proven, a few pages above, by the enthusiastic praise he gives of Alta.

Yet this is what Finnmark is, or what it can be. And there, without nuance, are the images that most of us have of this region: sometimes a sun which does not set and makes a green and blue sea, prodigiously clear, bubble without pause; "mountains of birds" enveloped by a swirl of thousands of snow-white wings; games of whales in the fjords and passes; along the coasts, millions of fish in tight bands; the thick grass of the mountains and plateaus where the Lapp grazes his reindeer; and sometimes the unending winter night overwhelming the country: the storm is unleashed on the land and on the waters; the waves break on the coast and the sea reaps its harvest of wrecks and corpses. So, we understand that from the mists of Finnmark are born the ghosts that populate the stories of our childhood: monsters and trolls, Lappish witchcraft, and the abyss opened under the sailor's skiff, and the days of tragic struggle in the mountains, against the snowstorm, and all that is terror and danger, − yes, danger, first and always!

We will perhaps better understand these singular differences in judgment of the Norwegians about their own country, if we remember that the distance that separates the extreme tip of Finnmark from Oslo the capital is greater than that from Oslo to Paris or to Budapest; that on the other hand Finnmark, with its 48,000 square kilometers of surface area, is larger than Switzerland, one and a half times larger than Belgium, and yet the population there is only 53,000 inhabitants (1930), including a fifth in the three cities of the region, which makes an average of 1 individual per square kilometer, even including the cities.[2]

Finnmark is the northernmost of Norway's 18 counties. It extends from about 68º north latitude to 71º 11' 8", where the point of Knivskjel sinking into the Arctic Ocean is the place in Norway and Europe closest to the North Pole, and which lies just west of the North Cape. From west to east, Finnmark goes from 21° to 31° degrees East longitude (Greenwich)[3]

This vast region has been divided by nature into two parts. The one, south of a line that joins the end of Varangerfjord with the southern end of Altafjord, is made up of the immense Finnmark plateau, whose elevation

[1] LEOPOLD VON BUCH: Reise durch Norwegen and Lappland. Volume II, p. 76. Berlin 1810.
[2] See the general map, at the head of the volume, and the special map, p. 7.
[3] These figures, as well as much of the information that will be found later, are borrowed from AMUND HELLAND: Topografisk-statistisk beskrivelse over Finmarkens amt. Norges land og folk (Norway: the country and the people). T. XX. Kristiania 1905.

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average elevation is 400 to 500 meters. It has almost no significant peaks. The valleys are wide and flat; the rivers flow slowly and cross numerous lakes or inland fjords. In the valleys, we sometimes encounter, as in Karasjok and Tana, old pine woods, but on the plateau we only see here and there small sparse birches or meager brushwood.

The northern part of the country is higher than the Finnmark plateau itself. The rivers that originate in the south, very close to the border, and which flow to the north, must make their way to the fjords through mountain ranges. The result, in the western part of the province, is valleys with a steep profile, which combined with glaciers and fairly high peaks, give the landscape an alpine character, sometimes even wild and tormented.

Starting from the north, powerful fjords cut their way into the interior of the country. These are, from west to east, Altafjord, Porsangerfjord, Laksefjord, Tanafjord and all the way to the east, Varangerfjord. The peninsulas which separate them only reach a fairly high height in western Finnmark. To the east, lower

elevation plateaus line themselves almost imperceptibly towards the sea. The action of the ocean undercuts the base of the mountain, so much so that the coast, over long stretches, forms a sheer cliff. This is the origin of these very characteristic salients, these "næringer", as the local elders say, which advance between the fjords and the bays. The North Cape and Nordkyn are the best known. If starting from the North Cape, we head towards the east, we see these capes succeed one another without offering any significant difference, like the plans of a grandiose setting. Only sometimes, one of them is distinguished by the nuance of the rock, like the stark whiteness of the quartzite cliff of the Porsanger salient. Even in summer and in good weather this coast is one of the most monotonous there is in Norway. Towards the north it goes on and on to the Polar Sea, and towards the south, the infinite gray-brown cliff, bare and steep, becomes at the summit a vast plateau of uniform appearance. In the storm, the sea rushes with all its might and power on this long coast, which is not protected by any island from Magerøya to Vardø. On the other hand, off the coast of western Finnmark, small or large islands form the channels that we see on the greater part of the Norwegian coast, although the channels here are wider and more open to the effects of the hurricane. Then, along the northern edge of Varangerfjord, from Vardø to Nesseby, the coast is again open, but lower, with widely curved sandy beaches, while the south shore, with its small fjords, channels and valleys, forms quite a varied landscape.

When coming from the open sea, as we enter one of these long fjords − Altafjord for example, or Porsangerfjord − the scenery changes little by little. Houses appear, with a few plots of cultivated land. Then one sees trees:

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first the birch; then the aspen, and finally some isolated pines. At the ends of certain fjords, along the rivers, slowly growing forests of large pine trees occupy the moraines, terraces, and sand banks, once formed by the sea and the glacier. One of these valleys, that of Tana for example, offers the traveler the same scenery as the north of Østerdal in southern Norway. The only difference is that the vegetation appears in the opposite direction: the forest increases as one goes further inland; the desolate landscape of the coast ultimately becomes a sort of virgin forest with a few clearings given over to cultivation.

The abundance of fishing and other benefits brought by the sea have attracted and retained a coastal population in Finnmark. It is on the coast that we find the towns and main activity of the province. All life there is based on fishing and hunting in the polar regions, for the preparation and export of these products, with the exception of Kirkenes in Sørvaranger, where the exploitation of iron ore employs a thousand people and where there are a few important sawmills. Inside the fjords, a little livestock farming and cultivation supplements the resources that are drawn from the sea. In places too, one has cleared and cultivated the best lands along the waterways, where the salmon abounds, as everywhere in Finnmark. This is how there are villages, like at the end of Altafjord, which is a true paradise, where even the wheat ripens during the short weeks of a warm summer.

So vast and disparate, Finnmark naturally offers violent contrasts from a climatic point of view. It is not just a question of the transition from the beautiful days of summer to the furious storms of autumn and winter, but of the temperature itself. A true continental climate reigns on the plateau. Minimums of -51° and maximums exceeding 31° have been observed there, and even at the ends of the fjords, the temperature can vary from 30° to -30° (Alta), or even -40° (Sørvaranger). The climate of the coast, in the regions bordering the ocean, is naturally less variable. In Vardø, extreme temperatures of 25.8° and -21.6° were observed over the course of half a century; but the warmest month of the year has an average temperature of 8.6° and the coldest -5.6°. All along the coast, from Vardø to Alta, the average temperature varies from 0.5° to 1°. On the other hand, the sea temperature, thanks to the Gulf Stream, approaches 5°. This results in a difference of 4 to 5°, which makes the country habitable and keeps the coast ice-free.

The sea, in fact, is never frozen during the winter and on the whole, the same goes for fjords. Only the interior parts of some fjords, where the rivers discharge a lot of fresh water, are frozen for a short time in the middle of winter, in Altafjord for example, at site number 59 (p. 114, fig. 36), but never at sites 56, 57 and 58. Porsangerfjord usually freezes quite far − up to sites 51 to 54 (p. 7, fig. 1). The polar ice pack

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begins only 30 to 40 miles north of the coast. When the wind blows for a long time in a storm from the north, it is sometimes seen from Magerøya, but it quickly disappears. Rainfall − excluding snowfall in autumn and winter − is not very abundant, considering the coastal situation, and depending on the location it does not exceed 300 to 700mm per year.

A reliable source of the history of Finnmark − the oldest of the literary sources that we have on this subject − is provided to us by Alfred the Great, the King of England, in his edition of the Universal History

of Orosius. His valuable information came from Ottar, who lived near the current city of Tromsø and who had personal knowledge of Finnmark[1]. Ottar's account can be either completed or corrected thanks to the burials of the same period (Viking era), which are relatively large in number for this province[2], and which prove that the fur trade, as well as hunting and fishing along the coast, already had a certain importance. The names of fjords like Porsanger and Varanger also seem to indicate that these waters were frequented by Norwegians quite a long time before the time of Ottar.

It must also be admitted that the history and prehistory of the region until a few years ago were very little known. This is quite understandable because the inhabitants are few, the country little known, very remote, and difficult to explore. Protohistoric finds from the Iron Age are completely missing, except for a few sites that are attributed to Sámi fishermen or hunters, and whose date is not very certain[3]. Likewise, we do not have any characteristic pieces from the Bronze Age. On the other hand, a local Neolithic civilization has long been represented by polished slate objects, stone axes, etc., which testify to an influence from the megalithic civilization of southern Norway.[4]

But even for this period, uncertainty remained great. The only thing that seemed certain from the finds made was that Finnmark had not become populated or frequented until very late in the Neolithic period.

[1] On this subject, see: GUSTAV STORM: Om opdagelsen av "Nordkap" og veien til "det hvide hav" (On the discovery of the North Cape and the route to the White Sea). Det norske geografiske selskabs aarbog, t. V. Kristiania 1894.
[2] A. W. BRØGGER: Nord-Norges bosetningshistorie (History of the settlement in Northern Norway). Instituttet for Sammenlignende Kulturforskning. Serie C II−4, Oslo 1931. See in particular the map of finds, ibid. pl. XV
[3] O. SOLBERG: Elsenzeitfunde aus Ostfinmarken. Lappländische Studien. Videnskabsselskabets skrifter II. Historisk-Filosofisk Klasse 1909, No. 7. By the same author: Ein neuer eisenzeitlicher Fund aus Ostfinmarken in Norwegen. Prähistorische Zeitschrift, t. III (1911).
[4] General studies: HELGE GJESSING: Finmarkens oldtid (The Prehistory of Finnmark), in the study by OSC. ALE JOHNSEN: Finnmarkens politiske historie (The Political History of Finnmark). Videnskapsselskapets skrifter. Historisk-Filosofisk Klasse 1922, t. I. No. 3. − O. SOLBERG: Finmarkens oldtid (Finnmark in antiquity), in the work by CARL SCHØYEN: Nordlandet (Northern Norway). Oslo 1920.

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This was the state of our knowledge when the Institute for Comparative Research in Human Culture (Instituttet for Sammenlignende Kulturforskning) included archaeological research in Finnmark in its program of study of arctic civilizations. This research was entrusted to Mr. Anders Nummedal, assistant curator of the Prehistoric Museum of the University of Oslo. Mr. Nummedal began his work in 1925, and from the first years the results were exceptionally rich. In addition to many recent Neolithic sites, he discovered a civilization of a much more primitive character. This gradually became the main object of research carried out each year and it is only this civilization that we will deal with here.

From the first finds of this sort, we had the impression of finding ourselves in the presence of something absolutely foreign and new in the prehistory of the North. The collected objects immediately raised problems whose scope we sensed, without being able to define it, and which called for a solution. With great generosity and a keen sense of the importance of these questions, the Institute provided the necessary funds for the research, which Mr. Nummedal was able to continue each year during the summer period when it was possible.

The research began in 1925 in Alta. The Amtmannsneset, Steinseng and Tollevik sites were then discovered and studied (sites 58−60; see map fig. 1 and fig. 36).

In 1926, the research focused on the Porsanger region, with sites Nos. 49−55: Repvågeidet, Vedbotneidet, Russedalen, Kolvik, Storbukta, Børselvneset and Steinsneset. These are the sites discovered during the two years that Mr. Nummedal reported in the book cited in the introduction, and to which we will often refer.

In 1927, together with Mr. Halvor Rosendahl, geologist, he explored the surroundings of Gamvik (sites Nos. 42−43), Berlevåg (sites Nos. 37−41) and Vadsø (Nos. 23−26).

In 1928, together with Dr. Gutorm Gjessing, archaeologist, he returned to Berlevåg and in the Vadsø region (sites Nos. 17 and 18), he discovered site No. 7, near Kirkenes train station (Jernbanestasjonen) and Seilmerket, Nos. 11 and 12, at the same area; finally Ekebergvika (No. 35) in Båtsfjord.

In 1929, assisted by Mr. Louis Smestad, preparer, he discovered Hamnesodden, Hansemolla and Katuglelva (No. 32−34), in Syltefjord; Messen (No. 8), Langøyra and Eidet (Nos. 13−14), in the vicinity of Kirkenes; Prestestua I (No. 1) and Kobbholmfjord I (No. 4), near the border.

In 1930, he returned to the sites of Syltefjord, Kirkenes and the border (Prestestua II and Kobbholmfjord II, Nos. 2−3), with Mr. Rasmus Buset, and discovered sites Skarsvåg and Valan (Nos. 45−46), in Magerøya island.

In 1931 and the following years, assisted by his son, Mr. Jon Nummedal, he again explored the sites, at Vadsø and Vardø, or Smellroren

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Fig. 1. Map of the distribution of the sites of Finnmark.

(No. 31) were discovered again, and extended the research done at Steinseng (No. 59); and then discovered Bossekop I (No. 56) in Alta.

In 1932, research was continued in Smellroren. The sites of Molvika and Sletta (Nos. 27−28), near Kiberg, were discovered, as well as that of Skjånes (No. 44) in Laksefjord, Isnestofta (No. 61) and Bossekop II (No. 57) at Alta.

The summer of 1933 was mainly spent searching for similar sites in the county of Troms, neighboring Finnmark to the west. The result was as negative as the visits of previous summers to the same region.

In 1934, Mr. Nummedal returned to Finnmark, mainly to carry out additional surveys and leveling. He visited Kirkenes, Smellroren near Vardø, Båtsfjord, Kongsfjord, Valan in Magerøya, Kolvik in Porsangerfjord, and Alta.

Let us point out, for completeness, that during the summer of 1935 he found a new site at Karlebotn, at the end of Varangerfjord, and two sites of lesser importance at Sørøya, in the northwest of the region that concerns us. The findings of this field season could not be included in the report that follows.

The next chapter will present a methodical description of each site and the objects it provided. The successive descriptions of the sites will be made starting from the east, and more precisely from the Grense-Jakob river, which separates Norway from Finland.

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THE FINNMARKIAN

The Sites and Artifacts.

Sites located near Grense-Jakobselv.

The border that separates Norway from Finland in the east is formed by the river Grense-Jakob (Grense-Jakobselv). The valley has only a sparse population, with a small group of houses very close to the mouth of the river, where the chapel of King Oscar stands. Immediately to the west there is a small fjord, called Kobbholmfjord. Beyond the mouth of the river in a westerly direction and on the east bank of Kobbholmfjord, there are many sites of varying importance: Prestestua I and II, Kobbholmfjord I and II, Kobbholmfjordbotn and Lillevatn. See Nos. 1 to 6 on the general map and the special map, fig. 1−2 (in the text).

1. Prestestua I.

U. O. Årb., 1930, p. 228, No. 75. C. 24579.[1]

To the west-southwest of the Little Presbytery (Prestestua), near the mouth of the Grense-Jakob River, there is a ravine that runs in a southeast direction between Kobbholmfjord and the Leirbekken stream, which flows into the river a short distance from the mouth. At an elevation of 45 meters above sea level, there runs a terrace that cuts the ravine; it has a rounded profile with large cobbles at the top. Site No. 1 is located on the southeast slope and on the terrace head (Pl. I). Nummedal discovered it in 1929 and visited it again in the following years. Under a thin touch of brier soil, we find quite coarse brown sand and small cobbles mixed with large tumbled stones. Some of the artifacts were collected on the surface, others discovered by digging in different places, all together an area of 5m^2. The artifacts go down to a depth of about 0.20m.

Beyond this terrace where the site is located, the land forms a depression with a small pond, then goes up towards a new terrace that blocks the ravine in its highest part. The site is therefore quite well sheltered, except against

[1] U. O. Årb.: Universitetets Oldsaksamlings Årbok. Annual publication of the University's Collection of National Antiquities, Museum of Cultural History, Oslo 1927−1934. C. 24579 designates the number of the

museum inventory.

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Fig. 2. Detail of the region of the Grense-Jakobselv

the southeast wind. When, in the past, the sea reached near the site, it was well protected on two sides by the ridges of the ravine and gently sloping bays were formed to the northwest and southeast.

The material collected is not very considerable, a total of 40 objects. The most widely used *raw material* is a grey-brown colored sandstone, with fine grain, resembling a quartzite and very suitable for implements neither large nor coarse; then, and less often, a gray quartzitic sandstone, with fine and tight grain, easy to cut and even giving good blades; finally, in only a few cases, hornstone (*hornstein*). There was also used a lot of white quartz, which cuts poorly and therefore gives very atypical implement shapes, mostly resembling blocks or thick flakes. We have the impression that it was quite difficult to obtain good raw materials in this place. A certain number of flakes, especially those made of sandstone resembling quartzite, come from cobbles collected on site or in the neighborhood.

Implements. — In total we collected 40 samples. Of this number, some (8), resembling cores, are made of hornstone. They are very small and very used, so much so that some have more or less the appearance of chipped implements, sometimes with a fortuitous cut at one end, like a sort of tranchet or hatchet. Their shape is irregular; for one almost conical, for others, sub-rectangular or prismatic. Several appear to have been reused as scrapers (pl. VII, fig. 1). The quartz provided a fairly large number of blocks or cores of irregular shape, almost all of which appear to have been used as scraping or blunt instruments (fig. 3). A red-brown block might also be characterized as a core-form scraper. Pieces more reminiscent of core discs are not found, with the exception of a large block of brown sandstone (dimensions: 0.116m x 0.105m x 0.094m), cut, in a cobble, into a very thick discoid core (pl. VII, fig. 2). One side (invisible in the figure) has coarse facets and would be ideal as a starting point for chip removal. The opposite side has been provided with a sinuous cutting edge, in the shape of a trencher (chopper).

Instruments derived from flakes. — We collected a limited number of small flakes, which most often have a plain striking surface, without facets. These

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Fig. 3. Prestestua I. Globular block of quartz roughly retouched to a scraper on two extremities. Natural size.

are mostly the size of waste. The largest show no trace of secondary modification, but many have chips or traces of use.

A fairly large number of implements are, however, made directly on flakes. Let us first mention a thick flake, taken from the surface of a quartzite cobble. It is roughly cut on both sides and shaped, at one end, in the shape of a sharp punch (fig. 4). Another thick, quadrangular flake has a beveled edge at one end, , on the striking surface, which a slight retouch has made a sort of axe. There are also two instruments which are almost the same as the grand tranchet of the Campignian. They were obtained by the same process: in fact, they were cut across a flake and have a cutting edge formed by the very edge of the flake. Their shape is sub-rectangular, with a cutting edge at both ends (pl. VII, fig. 3). This cutting edge shows no trace of use. The implement of pl. VIII, fig. 4 underwent the same treatment. It was obtained, by a double truncation, in a thick strip of gray quartzite. On both sides, the two edges of the blade are sharp and show no trace of use. The purpose of the implement is entirely uncertain. It could not, like the previous implement, also serve as a scraper. On the other hand, the truncation, on both sides, could be used for fitting, if we imagine the object as a sort of cutting instrument with two edges.

Another very large flake was roughly cut along the edge on both sides, with a sinuous outline, probably like a sort of scraper (pl. VIII, fig. 5). Two thick, fairly large flakes were extracted from a cobble and, by one or two rough removals on one of the faces, locally made into scrapers (?) (pl. IX, fig. 6). For the rest, let us content ourselves with highlighting a thin triangular flake which has received crude, long retouching, on one of the sides, so as to form a sort of point or rather a scraper (fig. 5). There are no real points, but a few triangular flakes which could, without modification, be used as spear frames. Two elongated flakes seem to have undergone a summary cut at the base as for the sleeves.

The blades and the slats, quite few in number, are mainly made of hornstone or a beautiful gray quartzitic sandstone. Most have traces of use; only a few have been intentionally adapted into typical implements. Fig. 7 of pl. IX shows a large and good sandstone blade with abrupt retouches on both sides, perhaps a sort of saw. The tip is broken and the fracture appears to have required,

by a desired crushing, a shape which made fitting possible (see fig. 4 from pl. VIII). A single blade, or triangular splinter, short and broad, has a blunt back, but only towards the tip. The result is a small tip which is not very far from those of Abri-Audi (pl. IX, fig. 8). The cutting edge shows signs of use.

We found five more or less typical burins, all corner burins, made with the best rocks of the place. The thick burin of the pl. IX, fig. 9, has retouched truncation, comes from a core used for so long that its striking surface is chipped, forming a sort of fairly sharp edge, which even seems to have been intentionally retouched to cut or scrape more effectively (bottom of the fig.). Another burin, relatively thick, bears polyhedral retouches. Fig. 10 of pl. IX shows one of the largest chips, with removals that appear to be due to burin blows at the tip of a fairly thick fracture.

2. Prestestua II.

U. O. Årb., 1931−32, P. 154, No. 62, C. 24866, and 232, No. 93, C. 25172.

The site called Prestestua II is located in the same ravine as the previous one, a little to the east and at a lower elevation of 38.5m above sea level, on a small plateau which runs along the ravine, at the foot of the mountain. Nummedal

explored it in 1930 and in 1931. His research covered about 10m². On a sandy bottom extends a touch of brier soil of about 0.20m. The artifacts were located at the bottom of the dirt bar and in the sand, to a depth of 0.10m.

The raw material used is almost exclusively hornstone. Only a few objects are made of quartz.

Implements.— In the totality of pieces, which is not considerable, only one, very small, can, strictly speaking, be characterized as a discoid core (pl. IX, fig. 11). There are only one or two small elements, with a retouched striking surface, which could come from the same core. Four or five bladed cores are more or less used; of this number, two, which provided fine flakes, are good (fig. 6f of the text). They are all very used, sometimes to the point of looking like chipped parts. None correspond, in size or quality, to the beautiful, fairly large blades that were cut at the site. The inventory is characteristic of a bladed civilization. It includes a fairly large number of good little strips and beautiful blades, which for the most part are chipped at the edges or broken by use; some have distinct notches, produced by chipping, fine retouching or a single removal (fig. 6e).

Typical instruments are also almost exclusively derived from blades, through retouching. Let us cite three good scrapers on the end of a blade, the other end of which has the shape of a burin − fortuitous burin, in one of the cases − (pl. X. fig. 12 and 13), and some scrapers of less careful workmanship. There is also an almost intact blade, with the bending specific to La Gravette blades the Upper Paleolithic (fig. 6c), and a piece of broken blade, of the same character (fig. 6d); in addition an irregular blade with fine retouches towards the end, in the shape of a piercer (fig. 6b), and a small blade with an oblique truncation (fig. 6g).

The burins also, of which there are a dozen more or less typical, are shaped on blades. Of the majority we can say without hesitation that they are burins on the angle of a broken blade, and as, with one exception, there is no retouching of the crown, some can undoubtedly be fortuitous. However, this is hardly the case in fig. 14, pl. X, where the burin is worn, not according to the edge of the blade, perpendicular to the fracture plane, but perpendicular to the plane

of the blade. Likewise the object of fig. 15 of pl. X is derived from a thick splinter, with ordinary coup-de-burin. The one in fig. 6a, which is also cut from a flake or a massive blade, has on one end the shape of a "flute mouthpiece" and the other that of a pointed burin, well retouched.

3. Kobbholmfjord II.

U. O. Årb., 1931−32, p. 153, No. 54. C. 24858.

Very close to the mouth of the Grense-Jakob River, to the west, close to the sea, is Lillesand. If, starting from there, we follow the east bank of Kobbholmfjord in a southwest direction, going up the Lillesand ravine, we arrive at the top of a terrace with large cobbles, and at a plateau which extends towards the southwest. At the very edge of the terrace appears the occipital bone of a whale. The rest of the skeleton must be buried in the ground, probably too damaged to be touched. By the way, the part that is in the air is quite well preserved.[1] A little further on the plateau, Nummedal in 1930 found cut stones, tools and waste. The

place, called Kobbholmfjord II, is located 65.70m above the level of the sea, is very exposed on all sides, or almost, to bad weather.

The objects collected, quite few in number (18 in total), are made of quartz and hornstone. We can see a very good little core of hornstone, a small blade with fine retouches, a small microlithic point of 0.015m forming

[1] Based on photographs, Dr. Johan Ruud asserts that the occipital belongs to the species called Greenland whale.

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roughly the shape of a half-moon, as well as an irregular flake of quartzite, with a flat retouch on the side near the bulb of percussion, forming a sort of scraper. The rest consists of flakes and bad blades. We notice that the quartzite was cut from cobbles.

4. Kobbholmfjord I.

U. O. Årb., 1930, p. 218, No. 45. C. 24 549 and 1931−32, p. 153, No. 53. C. 24857.

Following the telegraph line from Kobbholmfjord II in a southwest direction, after crossing low, marshy ground, then going up a ravine near Sølvbrua, there is a fairly narrow passage between two small heights. A terrace blocks the passage, then descends via a ravine towards the sea, located to the southwest. In the far west of the plateau, just below the highest point, Nummedal discovered a site in 1929. Excavations were carried out at several points, particularly at the foot of the western escarpments. It is sheltered from most of the winds. The soil is formed by a brownish sand, mixed with medium and small cobbles. It is partly bare, and partly covered with a thin touch of brier soil. The artifacts were found mainly on the surface, sometimes at a depth of about 0.10m. They come from various locations with a total surface area of about 20m^2, at a height varying from 61 to 67m above sea level. The site is called Kobbholmfjord I.

Raw materials — All the pieces, relatively scant (around 60 in total), present an almost complete collection of all the rocks usable in the same place and in the surrounding area: quartz, quartzite, diabase and hornstone.

Implements — The cores of quartz and diabase are rare and have small dimensions; of these cores, one is globular and may have been, like the others, retouched using a scraper. A thick flake served as a core, and repeated removals at one end accidentally gave it a sharp, scaled edge in the shape of a hatchet.

A large block or thick piece of quartzite, sub-rectangular or sub-ovoid in shape (dimensions: 0.16m x 0.103m x 0.09m (*chopper*) has undergone gross retouching all along one edge (starting from the lower flat face) and has a cutting edge in the form of a chopper or perhaps a sort of enormous scraper. The heel has been modified for gripping by a few removals (pl. X, fig. 17). A thick plate or flake of diabase, sub-rectangular in shape (dimensions: 0.153m x 0.156m), was cut roughly on one side in the shape of an enormous scraper or perhaps a chopper, because the edge of the lower flat face has some slight removals (pl. XI, fig. 18). A thick flake, of diabase, 0.065m in length,

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shows crude removals, like a sort of thick scraper. We also find, among a limited selection of blades and less important flakes, a few slightly modified pieces such as uncharacteristic scrapers. However, figure 19 of pl. XI presents a very typical instrument: a thin flake of hornstone that has been cut with a burin and whose striking surface has been retouched as a convex and concave scraper, which caused most of the percussion bulb to disappear.

5. Kobbholmfjordbotn.

U. O. Årb., 1931−32, P. 152, No. 52. C. 24856.

Further toward the west, at the end of the fjord, remains of knapping were found in various places in 1930: on a terrace overlooking the small lake of Kobbholm (Lille Kobbholmvatn), about 70m above sea level ; lower than the lake, about 50m above sea level, and lower still, 30 meters elevation. These places are united under the designation: Kobbholmfjordbotn (The end of Kobbholmfjord). The raw material is pretty much the same everywhere: quartz, quartzite and hornstone; the hornstone in particular provided an extraordinarily useful core. Nowhere have we found any characteristic instruments.

6. Lillevatn I and II.

U. O. Årb., 1931−32, p. 154, No. 60. C. 21864, and p. 154, No. 61, C. 24865.

Finally, we found traces of instruments in two places to the west of Lillevatn, a small lake located between Kobbholmfjord and the Grense-Jakob river.

Lillevatn I provided 12 pieces of hornstone, among which there is a medium-sized core, which seems to have been retouched as a scraper, and another, very small, used until it took on the appearance of a flaked piece. A flake, detached from a cobble, has been cut on two sides, with a scraper-shaped edge (?). Two pieces have the shape of burins, undoubtedly fortuitously.

From Lillevatn II, Nummedal brought back 14 cut pieces of quartz; among others, a sub-globular core, reused as a scraper, a sub-rectangular core retouched as a scraper at both ends, and a triangular flake with abrupt retouch on one side, while the other is sharper. This piece can be characterized as a small tip reminiscent of the type from Abri-Audi. The rest is composed of fragments and irregular blades, one or two of which seem to have been modified.

Nummedal sees in these remains the results of a brief stay of man in this place, which is located very high, 90m above sea level.

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Kirkenes Sites.

Then come a large group of sites in the Kirkenes peninsula, some near the factory district, others to the south, on the grounds of the presbytery, along the west bank of Bøkfjord. They are designated under the following names: Jernbanestasjonen and Messen, Prestegården I and II, Seilmerket I and II, Langøyra and Eidet (numbers 7−14 on the map, fig. 7).

7. Jernbanestasjonen.

U. O. Årb., 1930, p. 213, No. 38. C. 24542 and p. 215. No. 39. C. 24543.

Just opposite the trains station of Kirkenes is the house of foreman Amundsen, on a gentle slope, in the northeast direction (pl. I). The site is centered on both sides of the garden fence, to the south of the house. Nummedal and G. Gjessing explored an area of about 50m² there in 1928. Under a thin touch of brier soil which does not exceed 0.15m, there is a bed of brownish sand, not very coarse, mixed with cobbles which rarely reach the size of a man's head. The artifacts were located below the earth, up to a layer of sand and clay, located at a depth of about 0.30m. The center of the site is 66.40m above the sea (Dr. Tanner's leveling), but objects have been found at various elevations, from 60 to 68m above the sea. This site is called Jernbanestasjonen.

The material collected is considerable: more than a thousand pieces, most of which, however, are sizable waste. The most used rock by far, is hornstone, which must have been found there in abundance. It was used for smaller and finer tools − arrowheads, scrapers, burins, etc. − as in the other sites, but also for broken flakes and for heavy and bulky tools, such as scrapers, etc. The abundance of hornstone is also proven by the absence of characteristic flaked pieces at this site,. A little quartz and various quartzites were also used.

Implements[1]. — The cores are very small and irregular, much smaller in size than the many flakes and blades from the site. For the most part, they were transformed into tools, especially core-form scrapers of varied and fairly irregular appearance.

[1] The pieces of this site were loaned almost in their entirety to the exhibition of Comparative Prehistory at Anthropos in Brno in 1930. I found the exhibition partly dismantled and the antiques packed in crates. Despite the kindness of the director Professor Dr. K. Absolon I was only able to study part of the find, which contained the crudest tools of the site. As a result the description is not quite what I would have liked.

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Some are thick and more or less reminiscent of keel-scrapers. We also find real core-form scrapers. An excellent and very large sample − the largest core of the site − is shown in pl. XI, fig. 20. It is locally shaped like a scraper, in contact with the flat lower face. The cores made of quartz or quartzite rocks have, as usual, an irregular shape, sometimes almost round. Very often, they are adapted into scraping or striking tools.

In all the pieces, we can say that there is not a single typical discoid core. But we perhaps have the remains of it in the form of a few irregular cores; on the other hand, certain flakes have a faceted striking surface of the Mousterian type. Fig. 21 of pl. XI shows one of these pieces, with a finely retouched striking surface (at the very bottom of the figure), traces of use on the edges, and a notch between two protruding points. Longer blades often also have retouches on the striking surface, which in most cases must have been carried out before knapping. In general, preparation of the strike plan seems to have been more common here than at other sites. This remark concerns both bladed cores and discoid cores.

The site features a mix of two industries, blades and flakes. Some flakes are in the raw state; others, more

or less worked, have a Mousterian character. Besides fig. 21, we show here (pl. XII, fig. 22) a rectangular flake with a very oblique and faceted striking surface, with a scraper retouch or traces of use along the edges. Another rectangular angular flake, retouched on the upper and lower faces, was shaped into a point (?), which removed the striking surface and the bulb of percussion (pl. XII, fig. 23).

A fairly large number of triangular flakes could, without further modification, have served as points (armatures) for spears or spears. Dimensions and shapes vary greatly. Some of these pieces are about as wide as they are long; but there are some very elongated ones, which look like blades. The first are extremely thin, the others thicker. Two are shown in figs. 24 and 25 (pl. XIII), the first is finely retouched on the right side, like a typical Mousterian-type point. Retouching is also rare, while we often notice chips undoubtedly due to use. There are also similar chips, retouches or chips, with a point turned to the right or to the left. Fig. 8 presents one of these pieces, having fine retouches or chips on the left edge. Through a series of transitions, we arrive at shapes similar to those of Abri-Audi, which are also represented in this site. We will see here (fig. 8 b, pl. XIII, fig. 26−28) four flakes which have undergone a certain retouch,

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Fig. 8. Various tools at Jernbanestasjonen: Mousterian-type flake with rough retouching of the left edge (a); points to back, similar to general types of Abri-Audi (b) and Châtelperron (c−d); notched blade (e); core-form piece retouched as a scraper along one edge and used as a plane at the top (f). Hornstone. Natural size.

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Fig. 9. Various tools at Jernbanestasjonen: curved blade with oblique truncation and broken point (piercer?) (a); finely retouched piercer (b); double burin on core (e); corner burin on flake (d); flake with modified and retouched edges with a burin nose (or tap) at the top (e); burin obtained by a single blow (f); retouched bladelet (g). Hornstein. Natural size.

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although incomplete, along a convex edge. Fig. 28 shows a notch that appears to be intentional and which gives the piece the character of a scraper.

Some of these flakes seem intended for fitting. This is perhaps the case of fig. 23; quite certainly that of fig. 29 (pl. XIII), which also bears (usual?) chips on both edges, near the tip; and similarly that of fig. 30 (pl. XIII), which is rather a blade, broken towards the top, where we see the remains of a transverse retouch on the thickest part.

Pieces that can be characterized as scrapers are rare. Let us cite the pointed piece in fig. 31 (pl. XIV), a beautiful convex scraper, with scraper retouch at the base. The scraper and, in part, the scraper are sharpened by removals on the lower face, which removed the bulb of percussion. A similar combination is seen in fig. 8 f, thick core-shaped piece which bears crude retouching on one edge and which served as a plane at one of its ends. Fig. 32 (pl. XIV) reproduces a thin sharp flake (at the bottom). The right edge is well retouched and its toothed profile cannot be the effect of chance.

According to the description given in the Catalog of the Collection of Antiquities of the University, the site has several trenches. In the material that I had the opportunity to see, I only found one characteristic piece (fig. 10), of hornstone. The cutting edge, at the lower part, is chipped by use; the opposite extremity presents − perhaps by chance − a narrow and irregular burin.

Scrapers. — There are, as has been said, a large number of thick scrapers, derived from core-form pieces. The shapes vary. Sometimes they are pure core-scrapers (fig. 20), sometimes they are similar to keel-scrapers, sometimes with a narrow useful part as in the scrapers with snouts. Then, as everywhere, we find many simple scrapers on flakes of any shape. In general, the retouching is mediocre and summary. On the other hand, it is quite rare to find good scrapers on the end of a blade, with a useful part convex or not (pl. XIV, fig. 33−35). The last of these pieces can also be used as a piercer.

Notches are quite rare. Let us point out the useful implement in fig. 36 (pl. XV) a triangular flake, the base of which resembles an accidental burin, but was certainly suitable for fitting; it also has, at the tip, a finely retouched notch. These kinds of notches are also observed on the edges of blades (fig. 8 e), and sometimes come from a single concave removal. Fig. 37 (pl. XV) shows two ways of proceeding. It has a burin beak between two notches, one of which is obtained by retouching, and the other by a large concave removal, followed by a light retouching.

The blades must originally have been extremely numerous here. Even now we have a number of excellent ones; then comes a mass of pieces of blades, broken either by use or by their shaping into tools. There are several blades with a zig-zag edge, which are core starts

Fig. 10. Jernbanestasjonen. Tranchet of hornstone on a chipped flake. Hornstone. Natural size.

(see pl. X, fig. 16a−c). Some blades have retouches on the edges, sometimes flat, sometimes abrupt as in the Aurignacian blades. Of some, we can say that they resemble the points from La Gravette; others, those from Châtelperron, with transitions which lead to the shapes from Abri-Audi that we have spoken about. A choice is reproduced in figs. 8e−d (in the text) and fig. 38−43 (pl. XV−XVI).

There are only a few piercers, shapes on the ends of blades and in the median plan of these. The retouching is very summary (pl. XVI, fig. 44). Here there are a greater number of probable piercers, of another type. Those are blades − sometimes very thick blades − the tip of which is cleared by oblique or concave retouches and then forms like a beak projecting from the side of the cutting edge of the blade. The tool in fig. 35 (pl. XIV) could be placed in this group. We reproduce in figs. 9a and b (in the text) two pieces of this kind. That of fig. 9a is broken; the next has a point as fine as a needle and, as an exception, retouched on both sides.

Burins are common. The catalog shows 68. Most of the shapes are represented there, following the usual technique. There is also waste from burin cuts, a selection of which is reproduced on the pl. XVI, fig. 45. Some pieces are narrow core burins, like the double burin in fig. 9c (in the text), on core-form pieces, or on thick flakes. Fig. 46 (pl. XVI) shows a double burin on a thick flake; one of the ends presents a polyhedral burin, which seems to be sharp, the other a simple burin resulting from two intersecting blows. In fig. 47 (pl. XVII) we see a simple burin on an angle (sharp), combined with a core-form scraper at the other end. A thin flake (fig. 9e in the text) has undergone transverse removal, while the coup-de-burin, along the edge, is replaced by a notch. The piece thus resembles a drill (or tap) as much as a burin. The retouching on the left edge has also made the piece usable as a scraper. Figs. 48 (pl. XVII) and 9d (in the text) show corner burin on flakes, with a truncation retouched obliquely. Many corner burins were also made on blades (pl. XVII, figs. 49 and 50); this last reminiscent of the rare Noailles type. Sometimes the thickness of the edge made

the longitudinal coup-de-burin unnecessary, and the bevel is obtained by an oblique transverse cut (fig. 9f).

If we judge from the collection, the site had a fairly rich micro-lithic industry. These are sometimes small retouched blades, similar to those of Gravette, sometimes tanged arrowheads. I have seen some of these, without retouching on the leafy part. Finally, let us mention a unique piece (fig. 9g): a sort of false cran point, shaped in a thick backed blade, the other edge of which remains sharp.

8. Messen.

U. O. Årb., 1930, p. 226, No. 71. C. 24575.

On the other side of the valley, between the northern extremity of the lower Lake of Kirkenes and the railway siding, there is an elongated band of moraine lands, trending west-northwest. On the northern slope, Nummedal, in 1929, through surface and depth searches, found a site (see pl. I). The layers of the terrain are as in the previous site and the height above sea level is almost exactly the same. The site, located just opposite the engineers' mess, therefore its name.

Here too was used a greenish diabase, as well as a little hornstone and white quartz. As everywhere in the region, diabase was used for the largest and crudest instruments. The material is not considerable (54 pieces in total), and is mainly made up of waste

Implements — A very thick diabase plate was cut all around by coarse stone removal; one of the ends has been converted into a scraper, similar to a huge keel-scraper; the opposite end, slightly pointed, seems to have suffered slight removal, perhaps as a result of shocks. Dimensions: 0.12m x 0.095m x 0.051m (pl. XVII, fig. 51).

Another block, also cut from a cobble, has received crude retouching which makes it resemble a chopper with a very thick heel. However, this is probably due to an alternative knapping of flakes, and the piece should rather be considered as an irregular discoid core. Dimensions: 0.09m x 0.068m x 0.077m. The quartz objects include four cores of varying shapes, two of which were certainly reused as scrapers; a small block or core seems to have been made into a burin (of the busque type), and also into a convex and concave scraper (fig. 11a in the text). A piece of hornstone, which was undoubtedly originally a flake, has become by secondary cutting on both sides a small two-sided instrument with an ovoid outline. Let us also note some blades of hornstone and quartz, one of which, 0.05m long, seems to have undergone irregular reduction on one side. Among the other pieces, several bear traces of use.

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9−10. Prestegården I and II.

I − U. O. Årb., 1930, p. 227, No. 72. C. 24576.
II − U. O. Årb., 1929, p. 193, No. 57. C. 24381.

From the Presbytery (Prestegården) itself, a path goes south, crosses the fields, passes the Signal (Seilmerket) and continues along the eastern shore of Bøkfjord. A short distance and to the south of the presbytery, this path climbs a characteristic terrace, located 80m above sea level. On the way up, we come across two other terraces, one at 40 and the other at 60 meters above sea level. On the lower terrace, Nummedal discovered in 1930, in the path itself, the traces of the site known as Prestegården I (The Presbytery I). He brought back a fairly modest selection of instruments and waste of diabase and quartz, and a single blade of hornstone, in total 40 pieces. Of this number we count 10 core (one of diabase, the rest of quartz), of more or less irregular shape. Some look like discs; others have a globular shape, which is common for quartz cores on the Kirkenes peninsula. Several were intentionally cut into core scrapers, whose thick shapes sometimes resemble keel-scrapers (fig. 11b in the text). One of the flakes, of quartz, of 0.085m in length, was cut along one edge of the plane of the flake like a real scraper, while the opposite edge shows a strong notch, obtained by a few rough removals (pl. XVIII, fig. 52). Another long splinter also seems to have been cut into a scraper or rather into a point (length: 0.063m). A broken blade, quite thick, has a blunt back. A small blade has been slightly retouched with a scraper tip.

The site called Prestegården II is located a little further to the south, on the terrace located 60m above the sea, and on the path itself, like the previous one. It was discovered in 1928.

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Fig. 12. Presetgården II. Block of quartz, reuse (scraper or blunt tool?). Natural size.

Here too, quartz and hornstone were worked, which produced several hundred pieces, especially cut waste, extremely small if it is hornstone. On the other hand, unlike the rest of the region, diabase does not seem to have been used. As for the quartz, it must come from the cobbles of the neighboring moraine or from the site itself, because many of the pieces collected have retained remains of the original surface of the cobbles from which they were extracted.

Implements. — Five quartz cores have, as usual, varied shapes, due to accidents of exploitation. One of them certainly served as a scraper, following a retouch starting from a flat lower face, as in the keel-scraper. We can also identify a quartz core, which by alternating cutting on two faces took the form of a two-sided instrument (fig. 12 in the text). However, as one of the faces of the cutting edge is more oblique and smoother, this piece is similar to the samples from the Seilmerket site which we will further characterize as scraping instruments. The blades are few in number; several bear traces of use or chips which, in one or two cases, can take on the appearance of a slight denticulation. None has been retouched into the shape of a characteristic tool. On the other hand, flakes provided some real instruments. Thus, a thin flake of hornstone was

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cut along two parallel edges and keeps a natural sharp edge at both ends, like a sort of double burin or atypical tranchet (pl. XVIII, fig. 53). One or two smaller flakes have been slightly retouched in scrapers; some others, of hornstone and especially of quartz, have a burin shape, which is undoubtedly for the most part accidental.

11. Seilmerket I.

U. O. Årb., 1929, p. 190, No. 55. 24379 and 1931−32, p. 232, No. 9. C. 25170.

Further on, at 1.5 km south of the presbytery, a little above the west bank of Bøkfjord, rises a small rounded hill. At the top and on the slope, at the foot of the hill, two signals (seilmerker) have been erected for navigation on the fjord (see pl. II). To the southeast of the hill lies flat land. It was there that Nummedal discovered, in 1928, a site which was explored the same year and the following year. The place is fairly exposed to east and south winds. The ground is made up of a thin touch of grayish sand mixed with medium-sized cobbles and resting on the rock, visibly an old beach. The antiques were on the surface, either in the air or covered with a light touch of brier earth. We searched everywhere over a fairly large area. In total, we explored 20m^2. The height above sea level is about 70m. The site is called Seilmerket I to distinguish it from the next one.

Raw material. — For the smallest and most delicate instruments, was sometimes used quartz, white and

jasper, and more often hornstone, in addition a little of a sort of black flint and very little rock crystal. Some coarser instruments have been cut from rocks such as gneiss and diabase. Evidently, cobbles were collected at the site and experience showed that they were usable. The material is very abundant, but it is mainly small pieces, much waste. The real instruments are very few in number.

Implements — Only a small number of pieces, of quartz and hornstone, can be classified among the cores. They have ordinary shapes, elongated or sub-conical, and rarely globular. Most were, as usual, reused as scrapers. It is necessary to particularly mention a core or thick, elongated flake, made of hornstone, which has been retouched at both ends into a thick scraper-plane, reminiscent of keel-scrapers. On part of the edge, it has been retouched with a scraper, from a concavity which is perhaps due to sharpening (pl. XVIII, fig. 54). The material does not contain a core disk.

Among the instruments, let us first mention some crude pieces, which were shaped on blocks or large plates of rock, with a very modest size. A very large block of gneiss was, by some rough removal,

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Fig. 13. Seilmerket I. Scraper on a flake of hornstone. Natural size.

modified very unevenly in the shape of an irregular biface(?) (dimensions: 0.13m x 0.11m x 0.10m). Although this piece is very damaged, we can see that at both ends, it has parts crushed by impacts. Perhaps it served as a hammer. A rectangular plate, of the same raw material, has undergone some flat and rough removal on one edge and could have been used as a kind of heavy scraper or perhaps a chopper (pl. XVIII, fig. 56). Two fairly large plates, of greenish diabase, were recut on one edge to make clean instruments or to scrape, with a straight edge, for the one, and convex for the other (pl. XVIII, fig. 57). This is also the case, it seems, for three other irregular fragments of gneiss, where however the traces of intentional modification are less sharp, the pieces being strongly altered. These instruments, relatively long and heavy, are however in the minority. What characterizes all of the pieces is a light industry, wear on blades and small chips.

Instruments shaped like blades and flakes. — There is a large quantity of blades, especially of hornstone. Most show, like the flakes, traces of chipping due to use, but very few were intentionally made into instruments. A good blade 0.045m, broken at the tip, has chips on one edge, and an abrupt concavity on the other. Among the flakes, some of hornstone and quartz have been slightly retouched in the shape of scrapers (fig. 13); only one, of quartz, with its point shaped like a piercer; another, also made of quartz, has the shape of a small scraper with a convex edge. Quite a large number affect the shape of burins, which for the most part is certainly coincidental. But we also find a few pieces where removal from a coup-de-burin, whether on the angle of a fracture (Plate XVIII, fig. 58), or on a retouched truncation, does not leave the slightest doubt. Let us also mention a single coup-de-burin blade.

Finally, it is appropriate to note a number of micro fragments, flakes or small flakes, with more or less good retouching (fig. 14a−h). We must see, in all cases, small tanged arrowheads, having a sharp edge and the opposite edge retouched, either with an almost straight or curved back, or with an oblique truncation. Some have received, by chance retouching, a sort of notch. Others, which are broken, accidentally take the shape of geometric flints, or almost half-moons. Let us also point out a sort of double point or biface with a diamond-shaped outline, quite thin, cut on both sides by small flat cuts which recall the Solutrean or Neolithic technique (pl. XVIII, fig. 55).

Finally, some small pieces − bare pieces or flakes − have one or two sharp scales. They are, as usual, made of hornstone.

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12. Seilmerket II.

U. O. Årb. 1929, p. 191, No. 56. C. 24380 and 1931−32, p. 158, No. 70. C. 24875.
Ibid. p. 193, No. 58. C. 24382.
Ibid. 1930, p. 213, No. 37. C. 24541.
Ibid. 1931−32, p. 160, No. 71. C. 24876.
Ibid. 1931−32, p. 231, No. 90. C. 25169.

Starting from the previous site, a fairly steep slope, descending about ten meters in elevation, leads to a terrace which carries the lower sailing signal (see pl. II). This terrace was visibly formed behind a small rocky ridge, significantly lower than that which bears the upper signal. On this terrace, Nummedal carried out research during 1928 and the following years and opened three excavation sites which follow one another from west to east. The first is just south of the lower signal; the third exactly behind the rocky land that we talked about. These yards were called Seilmerket II, III and IV; but as they are located at the same elevation and are not more than 20 to 25 meters apart from each other, they certainly belong to one and the

same site. Moreover, following the extension of excavations in recent years, these three sites almost form one. In the following pages, they are united under the designation of Seilmerket II. Thanks to the humps located to the east and the west, the site is well sheltered from the wind in these directions; it is, on the other hand, exposed to the north wind.

In these three places, a total of 70m² were dug. The soil is made up of gray sand mixed with cobbles, covered in places with a thin loam. The artifacts were found on the surface and in some places at a depth of 0.30m. The richest part of the site seems to be the lower part, behind the rocky ridge. The height above sea level is 60m.

The collections made at Seilmerket II are, in terms of the number of pieces, among the richest in Finnmark; they are also so with regard to the size and quality of the instruments. As raw material, different kinds of rocks were used, which were undoubtedly found on site or nearby.

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The material most used is a white or gray-white quartz. It is tender, breaks poorly and therefore gives indistinct shapes. Quartz was used for more or less large instruments. For large, coarser instruments, quite often a greenish diabase was used, which is found in veins in the Kirkenes region. It is quite altered, especially when it has been on the surface, exposed to bad weather. For smaller tools, in addition to quartz, hornstone was used in large quantities, a little dark-colored dolomitic flint, a little rock crystal and various quartzites.

Implements — We found hundreds of blocks or cores at this site, belonging to all the species of rocks that were worked. The shapes are very variable, and, due to the raw material, often quite untypical. This is certainly also a challenge to the method of knapping. Obviously, mainly cobbles were used. This is what we can say with certainty about quartz, quartzites and diabase, which have preserved in places the polish of the original surface. These cobbles served as a core; the knapping was carried out by blows on a flat surface which was suitable as a striking surface, or a striking surface was created by a single summary removal. Thus fig. 59 (pl. XIX) shows the remains of a thick and flattened diabase cobble, which provided large blades by percussion on a flat side. Fig. 60 (pl. XIX) represents a large block of quartz, 0.152m long, which produced flakes by percussion on natural and artificial striking surfaces. It also seems to have been modified by secondary cutting into a sort of enormous keel-scraper (at the top of the fig.). Some diabase cobbles also resemble, more or less, similar scrapers, or core scrapers (pl. XIX, fig. 59).

Prolonged use naturally reduces the size of the block and as the cutting very often took place on several striking planes, this sometimes results in very irregular shapes. Let us first mention a fairly large number of cores, almost exclusively of quartz, which have been cut on all sides and can roughly resemble a faceted ball, − a very old form, but which is also observed much later, in any case until the time of the Scandinavian kjøkkenmøddings. Their size is about that of a nut; sometimes it reaches 0.06m in diameter. We rarely observe typical flake removal on characteristic pieces, and also rarely flat surfaces which could serve as striking surfaces. On the other hand, we sometimes find salient or pointed angles, often bifacial or polygonal in size, and we can assume that these pieces served as blunt or scraping instruments (pl. XX, fig. 62, fig. 16 in the text). Some resemble bolas from the Upper Paleolithic.

The cores identical or similar to Mousterian disks are quite numerous, of quartz, but especially of diabase and hornstone, which gives them more certain shapes.

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In general, the striking plane, the starting point of the fracture, is a flat surface, formed by a single removal perpendicular to the length of the disc. As a result, the flakes have for the most part a plain striking plane, which sometimes forms a very obtuse angle with the shattering plane with a large bulb of percussion, almost like on the Clactonian flakes. But we also find, in smaller sizes, discs with a faceted striking surface, which are very reminiscent of those from which the Levallois flakes were taken. The shape of the discs varies, as in central Europe, sometimes ovoid, sometimes sub-rectangular, etc. We have found several which are prepared, but from which no fragments have been extracted; others, on the contrary, have succeeded. In one or two cases, they have, following successive removals, taken the form of thin pallets. The size varies extremely, especially depending on the nature of the rock. Diabase disks are generally large, 0.10m or more in diameter. They are also roughly cut, and sometimes the object has such an appearance that it is suspected of having served as a chopper or a very heavy and crude scraper. But we cannot say that the site provided a truly large handaxe. A diabase disk which produced fragments is reproduced in fig. 61 (pl. XIX).

There are also few quartz or quartzite instruments that can be characterized as more or less typical discs. Of these, there are some large ones, but most are small, measuring up to 0.02m or 0.03m in diameter. Since the raw material does not lend itself to characteristic shapes, it is very difficult to determine its purpose. We

must particularly note many discoid tools, roughly cut, often on two sides, which produced a sort of zig-zag edge reminiscent of certain bifaces. No doubt such tools could have been used as scraping or scraping instruments, without secondary retouching (pl. XX, fig. 63).

On the other hand, the hornstone allows a much better and safer size. Among discoid cores of this kind, we find several which are perfectly typical, whether or not they have produced fragments. Dimensions vary from 0.02m to O.06m. A sample used is reproduced in fig. 64 (pl. XX). It is not rare that hornstone discs, after fragments have been taken from them, have been used to scrape; in one or two cases they were transformed by intentional trimming into special tools. Fig. 65 (pl. XX) shows a disk 0.05m long which, after having served as a core, was cut into a beak on the edge of the striking surface. One or two others, through repeated removals, are fortuitously provided with a cutting edge on one or more edges; but there are also discoid instruments that undoubtedly have an intentional sinuous edge on more or less extended parts of their circumference, like small bifaces (pl. XX, fig. 66).

Cores with blades, prismatic, conical, rectangular, etc., are extremely rare and not very typical. As there are a large number of blades and slats of different raw materials and qualities, the cause must partly lie in the fact that the cores have been used as long as possible, and often

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then transformed into instruments. Thus more or less typical cores or pieces of rock resembling cores were very often adapted into scrapers. An elongated block of quartz, 0.105m long, seems to have been intentionally provided, through retouching, with a terminal cutting edge which makes it a real axe.

Thick core-form scrapers. — The true core-form scraper − the core with a conical or prismatic shape − reused as a scraper at the base, is very rare. The hornstone provided a typical sample, a very large and little-used core, which has characteristic scraper-like retouches, starting from the lower face. It also seems to have undergone sharpening by ablation of the posterior edge of the core (perpendicular to the plane of fracturing of the blades) (fig. 15a). Certain tablets, retouched locally in scrapers, are undoubtedly due to a refinishing of this type, applied either to a core scraper or to a keel-scraper (fig. 15k). Diabase also, as said above, provided one or two pieces of coarse size, a sort of enormous core-form scraper. On the other hand, we have a large number of thick scrapers which are roughly reminiscent of keel-scrapers, more or less elongated or discoid in shape, and which are modified in different ways and even in the shape of a snout. There are also several examples of a kind of multiple scraper and sometimes on various planes. Thus we can identify core-form and "keel" scrapers, or thick, concave and convex scrapers. Quartz is mainly used for these instruments; it is also difficult to produce satisfactory reproductions (fig. 15b, c and e). There are also some very large and poorly maintained instruments which are shaped directly on plates or thick pieces of rock, with a crudely shaped heel for gripping. The scraping or scraping part results from the rough retouching of a more or less protruding part, starting from the lower face, which is always flat. The name planer, in many cases, would be just as appropriate as that of scraper. Two pieces are of diabase, the rest of quartz or quartzite. A sample of this kind, of quartz, has already been reported (pl. XIX, fig. 60). On one side it has a good retouch forming a sort of enormous hull scraper. Others, cut from massive rock plates, have at one end a sort of wide, convex, rarely concave scraper (pl. XXI, fig. 67). A thick piece of dolomitic rock is retouched into a sort of sharp-keeled scraper, which has a concave lower face.

In total, we mainly encounter scrapers or pseudo-scrapers at this site. The most numerous, by far, are flakes of any shape, retouched with scrapers on more or less extensive parts. Fig. 68 (pl. XXI) shows a flake of this kind which bears a fine scraper retouch on one edge (to the left of figure b) and, in addition, a coarser retouch, also on the plane of the flake (at the top of the same figure). This last scraper was sharpened by removals on the upper face (at the top of figure a), and we thus obtained a sort of

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Fig. 15. Various tools at Seilmerket II. Core scraper with refreshed striking surface (a); thick scraper on small block (b); on massive flake (c, e); scraper on blade end (h); on short blade (i); sharpening slice of a core (cf. a) (k); blades and flakes with blunt backs (d, f, g, i). Hornstone (a, d, f, h, i); quartzite (g, k,1) and quartz (b, e, d). Natural size.

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Fig. 16. Seilmerket II. Globular core having served as a scraper at both ends. Quartz. Natural size.

sharp, zig-zag scraper. Special mention should be made of a certain number of elongated blades or flakes, the striking surface of which is recut into a scraper by abrupt retouching, in a manner reminiscent of the tools

called *sinew spawner* by Mr. Leakey. This retouching should not be confused with the preparation of the strike plane on the core. Besides fig. 68 (pl. XXI), figure 85 (pl. XXIV) gives another example that is not entirely typical.

Sometimes, however, we find more characteristic shapes: thus (pl. XXI, fig. 69) a thin snout, well exposed by two notches rather crudely retouched and chipped by use, opposed to a burin or rather a concave tranchet (at the base). Another instrument seems to be a combination of scraper and burin (pl. XXVIII, fig. 109) or scraper and burin (pl. XXI, fig. 70), as is often the case in the Upper Paleolithic. Finally, let us confine ourselves, for the moment, to mentioning a certain number of blades slightly retouched into scrapers.

Tools derived from blades. — Due to the raw material, it is extremely difficult to distinguish real blades from flakes which have more or less the shape of blades. So we will talk about these little instruments in one go. A large quantity of real blades of average quality were found, especially of hornstone. Most have chips or traces of use on the edges, rarely retouched (pl. XXI, fig. 71). On the other hand, it is quite rare that they have been adapted into characteristic tools. The reason for this is, undoubtedly, that hornstone blades were too precious a material to be used for more vulgar instruments, for scrapers for example, while they could perfectly well, in their original state, serve as knives. Thus, there are few knives with blunted backs, and the modification is most often limited in these cases to a slight local retouch, in particular towards the tip, to adapt the piece to the finger (fig. 15d, f , g). It is very rare that they

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Fig. 17. Seilmerket II. Scrapers of quartzite (a, b) and of quartz (c.) Natural size.

are cut all along the back, and again with a blunted edge, like Châtelperron blades or Neolithic knives (pl. XXI, fig. 72). One or two blades are retouched on both edges; a broken blade resembles the blades of La Gravette. Others are retouched at the point or on one edge, in convex or concave scrapers (pl. XXI, fig. 73, fig. 15h and l in the text); quite rarely they have small notches, mostly due to a chip and in exceptional cases to a retouch (pl. XXI, fig. 74); in exceptional cases, there is a slight denticulation of the edge (pl. XXII, fig. 75). A single flake or very thick blade has the shape of an almost typical groove (pl. XXII, fig. 77). A large quartz blade has a protruding spur on one edge, the result of alternate removals, in a manner that is more reminiscent of the Mousterian than of later techniques (pl. XXII, fig. 76).

Tools derived from flakes. — We will recall what was said above about discs and flakes, adding only that the flakes are of very variable dimensions, depending on the nature of the rock. The quartzite yielded many, of medium size; Diabase flakes are for the most part very large and often have the edge crushed or chipped by use. An interesting piece, which certainly was intentionally shaped into a tool, is reproduced in fig. 78 (pl. XXII). It is a massive flake, with a retouched striking surface, sharpened at the point by crude removal on both sides, forming a blunt tool. Some thick flakes − or fragments of plate − of quartz or diabase, are recut on a single edge, with a flat retouch which makes them more like sort of crude scrapers (pl. XXII, fig. 79). Moreover, it is not possible to establish a precise distinction between the latter and the coarse scrapers, also on plates, of which we spoke above (pl. XXI, fig. 67).

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Fig. 18. Seilmerket II. Flake-points due to partial or complementary retouching. Quartzite. Natural size.

There are also a few thick and elongated flakes, oval or sub-angular, of quartz or quartzite; They were cut on both edges into one-sided, two-sided or alternate pieces, which are a sort of very crude double scraper. Fig. 80 (pl. XXIII) shows the largest. It is only retouched on the upper side, the lower side having received only a summary size, on either side of a median longitudinal edge, an modification which makes the object more manageable. Its length is 0.097m. Others measure only 0.05m; but their analogies are so great that, without doubt, there is an intentional form of instrumentation here. We will also meet these same tools at many sites.

We also find a small number of small flakes, sometimes thin, single-sided, which must be scrapers (fig. 17a−b); one or two are also cut on both sides. Fig. 17c represents a quartz flake which has a flat two-sided cut, with fine retouching (or chipping) of the working edge and a thick heel, suitable for gripping, or perhaps retouched quite roughly as a convex scraper.

An interesting tool is reproduced in fig. 81 (pl. XXIII). It is a thick plate of quartzite, which on one edge has been roughly recut into a sort of scraper. All around one of the ends, it bears the trace of crude removals, which form a notch which was perhaps used for fixing in a handle. We should undoubtedly see in this piece a seat with a notch. A good number of flakes of varying size were used in cutting tools. Of this number, half a dozen (two of hornstone and the rest of diabase) resemble or are identical to the Campignian "grand

tranchet". Most are well cut, with a sub-triangular outline (pl. XXIII, fig. 82). Others kept the natural shape of the flake, with an intact percussion bulb at the end or on one of the sides and received only a summary modification. Two pieces were cut across a flake and thus have at both ends an edge formed by the very edge of the flake or the blade (see fig. 3, pl. VII); One of these "slices" is cut in the shape of an elongated axe. Sometimes the edges of these pieces could have served as good scrapers. This is the case in fig. 82, which has undergone fine secondary retouching on the concave edge (a). Fig. 83 (pl. XXIII), on the other edge,

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Fig. 19. Seilmerket II. Burins of the type burin-busqués. Hornstein. Natural size.

is more of a burin scraper than a tranchet.

On other fragments, which also have a sharp edge where traces of use can be seen, the rest of the perimeter may have been shaped into various tools: scrapers, scissors, etc. Thus, fig. 84 (pl. XXIV) shows an ovoid flake of hornstone, one side of which retains its natural sharpness, chipped now by use, while the rest of the edge has undergone a two-sided cutting to form cutting edges or a sort of alternating concave scissors. Fig. 85 (pl. XXIV), of hornstone, also has, on one side, a natural used edge. The opposite side is recut quite roughly on both sides; in addition, the striking surface was abruptly reworked into a scraper. The whole thing is thus a sort of knife-scraper-scraper.

Overall, the size of the striking plane or the bursting plane is one of the features that characterize the site's technique. We see this, for just one of these surfaces or for both at the same time, on a host of more or less large fragments. This results, in most cases, in tools of rather accidental shape, which were used briefly to cut or scrape. Fig. 86 (pl. XXIV) presents a flake of this kind of quartzite; retouched, of the surface of fracture, locally form a sort of uneven edge; in addition, a single removal, perpendicular to the striking plane, undoubtedly made it usable as a scraper.

Characteristic points are rare. In addition to triangular flakes, which could, without secondary retouch, have served as reinforcements, a small number have been intentionally shaped on the edges, either by retouching (sometimes on the lower face), or by crushing the protruding parts. Figs. 87−89 (pl. XXV) show three flakes with retouched striking surface, one of which shows long retouches along one of the lateral edges, the other shows retouches on the lower face near the tip; the third suffered a slight modification on both edges. Similarly, we find four fairly large flakes, triangular or sub-triangular, fitted or not on the edges, and which are roughly shaped at the base into a sort of tang (pl. XXV, fig. 90, pl. XXVI, fig. 91). A considerable number of triangular flakes have been retouched to be blunt on one edge. Some resemble the points of Abri-Audi; others are more or less close to

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blades with dos rabattu backs. They are generally small instruments and their quality is mediocre (pl. XXVI, fig. 92, fig. 18 in the text).

Burins. — There are very many burins at this site. As they have was, most often, obtained by very brief work on difficult and even rebellious material, we see a host of more or less crude forms. Even if they are real burins, they have not been sufficiently worked to be clearly distinguishable from accidental shapes. However, even if we leave these aside, there remain in any case around fifty pieces which we can characterize without hesitation as true intentional burins.

Only a few closely resemble core-form scrapers, since they have, at one end, a useful edge, the result of multiple retouches starting from a flat lower face (pl. XXVI, fig. 93). In part, these are undoubtedly cores which have been transformed into burins. Others, quite thick, are derived from blocks or thick flakes provided with a bevel by an abrupt cut, starting from the flat lower face; they are more or less reminiscent of the Aurignacian hooked burin (pl. XXVII, fig. 101, bottom, pl. XXVIII, fig. 108, top, fig. 19 in the text). But the vast majority of Seilmerket II angle burins come from blades or rather irregular flakes of lesser thickness that received relatively simple modification. Quite rarely, it consists of two burin strokes, given at an angle, so as to produce a sharp bevel, of the fine beak type. But we find more or less typical pieces, sometimes obtained by a slight retouch, or rather a modification on one side, reminiscent of Bourlon's burin on a pointed blade (pl. XXVI, fig. 94, 95). However, in most cases, we are dealing with angle burins, originating from an appropriate fracture angle. This is made either by a normal burin blow, carried along one of the sides, perpendicular to the fracture plane, or more rarely by a blow perpendicular to the longitudinal plane of the flake or the blade. Sometimes, the burin cut is replaced by a retouch in the shape of a notch (pl. XXVI, fig. 97). Pieces which would be typical angle burins on a broken blade are rare (pl. XXVI, fig. 98); as a general rule, flakes of more or less accidental shape were used (pl. XXVII, fig. 99, 100); sometimes with multiple facets (pl. XXVII, fig. 101); it is also not uncommon for the fracture itself to have undergone a slight or

irregular modification, to make it more usable. In other cases, the point has required, next to the coup-de-burin, an abrupt retouch by blows on the bursting plane, which gives shapes identical to the "angle burin with retouched truncation" (transverse, oblique or concave) of classic French deposits (pl. XXVII, fig. 102−106, pl. XXVIII, fig. 107). This technique is organically linked to real blades, but it is also rarely observed on fairly large flakes (pl. XXVII, fig. 106). In two cases, the coup-de-burin was made in such a way that the piece resembles plane burins (pl. XXVIII, fig. 107); but this is perhaps the result of chance.

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Fig. 20. Microlithic tools of Seilmerket II: burins (a, f); scrapers (b, c); tanged and notches blades (d, e, g, h, i). Flint, quartz, and quartzite. Natural size.

Finally we will content ourselves with indicating that here, as everywhere, there are multiple burins, or burins combined with other tools: burin-scrapers, burin-burin. Fig. 108 (pl. XXVIII) shows a thick flake, one end of which is cut into a burin, the other into a burin of the type of a busque burin; and fig. 109 (pl. XXVIII) a flake with two alternating scrapers and a single burin at the top.

Pieces that could be called burin blades are rare.

Microlithic implements.— In addition to a small number of microlithic burins (fig. 20a, f) and a very small number of blades with turned backs, including two of quartz (fig. 15i), we find a limited choice of microliths of different kinds. As an exception, these are blades retouched in scrapers at the point or on part of the edge (fig. 20 b); sometimes they are quite thick flakes or blocks of microlithic size, which were retouched into keel-scrapers, often very narrow (fig. 20c). Isolated blades atypically blunt over a curved back, almost half-moon shaped; but, as for figure 20g which has the shape of a triangle, they are almost certainly broken arrowheads, with a tang or notch. The small tanged points occur in large numbers; most often they are simple blade bits or sub-triangular flakes, with a slightly shaped tang (about 15), including one quite large (fig. 20i). But we also find a certain number of tanged points (5), the leafy part of which has a cutting edge on one side, the other having a blunt edge (fig. 20d, h).

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13. Langøyra.

U. O. Årb. 1931−32, s. 157, No. 70. C. 24874.

1.500km south of Seilmerket there is a wide bay with a long sandy beach called Langøyra. The trail leaving from Kirkenes, which we have spoken about, passes above the beach between two moraine groups, at about 54m elevation. Along this trail, Nummedal found in 1930, over an area of about 50m, a series of places, as big as a tent, where the grass covered worked stones. As they all follow each other without interruption and at the same height above the sea, Nummedal considered them, certainly rightly, as inseparable and contemporary.

As usual, hornstone and a little good quartzite were used for the small tools. However, it seems that these kinds of rocks were difficult to obtain. Also, at this site, much more quartz was used than usual. This material provided a very large number of cut blocks, not to mention the flakes and blades, which are quite few in number but very good, if we take into account the material used. The larger instruments are quite often of a greenish diabase. Most quartz pieces represent more or less extensive remains of the outer surface. They were most certainly cut from cobbles taken from neighboring moraines and it is possible that the diabase has the same origin.

Implements. — The cores are quite numerous. We can say with fair certainty that there are 63 of quartz, 8 of hornstone, and 6 of diabase. We cannot say that there are typical discs there; but most, especially those of diabase, are irregular flakes nearly discoid in shape, most often however with a plain striking surface, due to a simple removal without facets. The knapping of blades or flakes, or even an intentional cutting of the edge gave the pieces a shape such that one could see real scrapers (pl. XXVIH, fig. 110), planes, or sorts of slicers (choppers) (pl. XXVIII, fig. 111). Let us note separately a very large core, with fairly regular removals on one of the sides, from a lower face that is partly flat and partly retouched; its dimensions are 0.12m x 0.09m x 0.077m (pl. XXIX, fig. 112). Among the hornstone cores, there are also several which more or less resemble Mousterian discs, but all are very worn, to the point of being almost unrecognizable, and bear sharp scales at one or both ends (pl. XXIX, fig.113). A small elongated core, which provided beautiful blades, measures only 0.024m and is almost completely worn out; a larger one, conical in shape, is still very thick, although it seems to have served as a scraper and even to have been sharpened by removal on the lower surface. Moreover, this small core (0.037m x 0.034m) underwent double knapping,

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Fig. 21. Fragment of a blade with a blunt back. *Langøyra* (a). Tanged arrowheads. *Eidet* (b, c). Quartz and flint. Natural size.

lengthwise on the front side, crosswise on the back side. This varied or multiple use of cores is, as we will see later, very common in the quartzite and quartz industry, and it makes them almost unrecognizable.

The majority of these blocks of quartz is composed, as we have said, of cobbles, from which were cut flakes by percussion, applied in the appropriate place better. As a result, the shapes are very variable and for the most part, are the result of chance. There are some which are almost discoid, others are long bladed cores; but they are generally rounded, with irregular reliefs over the entire surface. However, most have one or more striking planes which could serve as starting points for producing blades or flakes, and which very often present an intentional retouching of the edges, these pieces having been transformed by later retouching into scrapers. Some are multiple, used in several places and on different planes. Finally, others have protruding parts with a bifacial flake, like blunt instruments (pl. XXIX, fig. 144). Moreover, it goes without saying that with this raw material, it is extremely difficult to specify the shape of the tools.

Instruments derived from flakes. — Let us first mention a small diabase plate (dimensions: O.06m x 0.051m x 0.017m) which seems to have been converted into a scraper by a few rough removals around the perimeter. She appears to have been altered by water. More interesting is the instrument in fig. 115 (pl. XXIX), a cordiform plaque of porphyry stone, very roughly cut along the edges and with invasive retouches on one of its flat faces. The heel, flat and quite thick, is slightly adapted for gripping. This instrument, which can be seen as a two-phase tool, seems to have been crushed at the tip by use.

Among the true flakes, several have also been adapted into specific instruments. We show here in fig.116 (pl. XXX) a triangular flake with intentionally toothed edges. At the toe, there are slight removals, which are undoubtedly due to a shock and not to intentional retouching. The base is roughly retouched with corresponding modification on the upper surface, much like Mr. Leakey's '*sinew frayers*', so that the carving has caused the greater part of the bulb of percussion to disappear. Several large flakes of diabase

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have been recut to form various tools. Certain elongated flakes have been retouched on one edge using scrapers or scrapers, uniface, rarely biface sometimes also at one end (pl. XXX, fig. 117). Certain fairly thick flakes, of the same material, were intentionally made into very heavy scrapers, circular or oval, by abrupt retouching on a more or less large part of the perimeter (pl. XXX, fig. 118). Finally, let us note some small flakes of quartz which have been recut, with flat retouch, in the shape of a scraper with a convex edge, and a certain number of triangular flakes, of quartz or diabase, in the shape of points, of which only one however has suffered an intentional modification on the edge.

Tools derived from blades. — There are very few blades of hornstone and a few, irregular, of quartz, most of them with traces of use. With the exception of the tip of a quartz blade, with a blunt back (fig. 21a), there are none of which we can say with certainty that they have been retouched to make tools. A small hornstone blade however has a slight retouch on one edge; two, in dark quartzite, have chips on the edge (pl. XXX, figs. 119, 120). Two blades or long quartz flakes show slight retouching, perhaps in scrapers.

Burins. — Not a single one is certain, although several flakes of hornstone or quartz, with a fortuitous bevel, could have served as burins.

14. Eidet.

U. O. Årb. 1930, p. 227. No. 73. C. 24577.

The excavation site, which has no special name, is located about halfway between Kirkenes and Elvenes, on the west bank of Bøkfjord, just opposite the isthmus bordered by Lake Svartaksel, on the east bank of the fjord. This name was given to the site, although it is not precise. The place is covered with grass and brush. The artifacts were collected, some along the path, until 60m above sea level, the others lower, near a buttress about 40m above the sea. Nummedal found them, in 1930, either on the surface, or by digging here and there.

As usual, diabase, quartz and quite a bit of hornstone were worked. It is curious that the diabase pieces (13 in total) are singularly small, compared to those at other sites in the region. Other rock species also commonly provided waste and small tools (in total 76 pieces). First is the case of the cores, 6 in number, made of quartz, of irregular shape, undoubtedly usually used as scrapers. Most of the other parts are waste. However, there are a certain number of blades and strips with traces of use, but without further modification. Two were shaped into tanged arrowheads (fig. 21b, c). Let us also cite

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three thin flakes of hornstone, which have been cut into a circular shape, by retouching affecting both the upper face and the plane of the flake. They all lost their percussion bulbs. There is no doubt that this is an intentional form of tool, but it is difficult to specify its purpose. Perhaps they were scrapers, or small bifaces (see a sample pl. XXX, fig. 121), as we saw at the Messen and Seilmerket sites.

Sites located on the north shore of Varangerfjord.

On the north shore of Varangerfjord there is a series of sites along the water, starting from Nesseby, just at the head of the fjord, and continuing to the edge of the town of Vadsø. That is the order that we will describe them.

15. Nesseby I.

U. O. Årb., 1928, p. 110. No. 46. C. 24,212.

Just above the Youth Club in Nesseby, on a terrace 45m above the sea, a site was found in 1927. Excavations were carried out in various places, with a total area of about 10m². The antiquities were found either on the surface or at very shallow depths in the sand bar. The site is called Nesseby I.

From this terrace located at an elevation of 45 meters, the land descends abruptly to another terrace located 25 meters above the sea, which corresponds according to Dr. Tanner to the local Tapes shoreline. On this second terrace, we found objects of Neolithic shapes.

The upper terrace yielded quite considerable material, waste and tools of varied nature, sometimes in very good quartzite, sometimes of hornstone, and very little in white quartz. In addition we find here the dark dolomitic flint that plays such a great role at the sites located further west, then two cut cobbles, of a red-brown quartzite, which are commonly encountered in the other sites of the Varanger Peninsula (pl. XXXT, fig. 123). Some pieces visibly come from cobbles, because they retain remnants of their original polished surface.

Implements. — The cores of this site − about two dozen − are generally exceptionally small and measure 0.03m to 0.04m in diameter. A single bladed core, elongated, reached a length of 0.048m (pl. XXXI, fig. 122). The striking surface on certain cores is flat; on others it is faceted, traces of which can also be found on flakes and blades. We encounter real discs, although they were used until almost unrecognizable and, subsequently, still sometimes used as scrapers. Three quartz discoid cores were made into ovoid bifacial instruments with a very sharp edge on all sides.

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Fig. 22. Tanged arrowhead; two flake-points with retouched edges; sharpened slice of a core. Nesseby I (a−c) and Røverelv (d). Quartzite and hornstone. Natural size.

Of these, two are thin and small; the third is bigger and thicker, and superficially resembles fig. 12 (in the text) of Prestegården II. This shape is, however, undoubtedly due to chance. Its origin is the knapping of blades or flakes using alternating blows on either side of the edge, the most practical method with a material that breaks so poorly. The six bladed cores are rectangular, prismatic or conical, and more or less regular. The best sample, in dolomitic flint, is reproduced in fig. 122 (pl. XXXI). It seems to have been used as a scraper, at the narrowest part of the lower extremity, on the side opposite the striking surface, and it even suffered a sharpening. This secondary use of cores as scrapers is very common here, as in all Finnmark sites, and this is due, at least partially, to their paucity of good raw materials.

Some very crude instruments are, here too, the result of direct knapping of cobbles. Two thick slabs of red-brown quartzite were recut on one edge starting from the flat lower face to form very heavy scraper blades. Fig. 123 (pl. XXXI) is one of them, knapped rather abruptly, scaled in places, like on certain Mousterian scrapers. The other has undergone a rougher knapping, but is also flatter, and actually closer to a real scraper.

Tools derived from blades. — Two dozen more or less sturdy blades have, as usual, slight traces of chipping from use, which sometimes take the form of irregular denticulation. But a small number have also been adapted into real instruments. We can only identify three which underwent a more or less energetic or extensive dorsal rounding (pl. XXXI, fig. 124). Let us also mention three tanged points, one of which has a single edge with abrupt dorsal retouches, the other two being of the simple type that we often found (fig. 22a).

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Fig. 23. Nesseby I. Flake with a point made by two cuts. Hornstone. Natural size.

Tools derived from flakes. — Overall, the industry of this site is characterized by extensive use of fairly small fragments, even when they are accidental. Some were used in their original state, as shown by numerous chips and traces of use; the others were intentionally adapted into true tools. As we said, the percussion plane may or may not be faceted. In the latter case, it often forms an obtuse angle with the fracture plan. Often the strike plan and part more or large moires of the bulb of percussion have been removed by knapping; or we have practice retouching on the fracture plane, very close to the point of percussion. A characteristic example that is distinguished from others only by its size, and the resulting rough flake is reproduced in fig. 125 (pl. XXXI). It is a flake of 0.12m in length, in gray quartzite, with notches on the sides. The base was modified by crude removal of the fracture plane that made the bulb of percussion disappear. The tip appears to have been intentionally trimmed making it blunt. Fig. 126 (pl. XXXI) shows a thick flake which, on one side, bears a deep notch produced by a single blow. The percussion bulb was removed by a single transverse blow and the shattering plane has a flat retouch on one edge, the intention of which is not clear.

A similar cut, transverse or oblique, of the part that carries the bulb of percussion is sometimes combined with a removal perpendicular to the previous one, a sort of burin cut, producing shapes that correspond to the burin on fracture angle, although the blow of the burin caused a completely oblique shattering (see pl. XXXI, fig. 128, pl. XXXII, fig. 129). There are several cases of this kind and some authentic burins were found at the site. (Pl. XXXI, fig. 127). The knapping may very well not be accidental.

Very often, the knapping extends to more or less large parts of the bursting plane. Sometimes this has completely disappeared, and one or more cutting or scraping edges have resulted, accidental or not. In several cases, this results in a false appearance of the core used, as in fig. 128 (pl XXXI), where we see a fairly thick flake of quartzite, which not only has been retouched as a scraper, but forms a sort of burin at the other end and on one edge (concave)

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This combination of scraper and burin is found several times, but other multiple tools are also found. Thus fig. 129 (pl. XXXII) shows a thin flake of quartzite that has undergone cutting on both sides, with removal of the bulb on the side of the striking surface. We also see that the burin cut already mentioned was made on one of the angles, and finally that one side has undergone an alternating retouch into a scraper, a form of tool of which we also have one or two small examples.

Four fairly small triangular flakes have fine retouching or intentional crushing on one edge, at the tip (fig. 22b, e); another, which bears no trace of modification on the edges, was made by a single removal at the base, with a sort of tang (pl. XXXII, fig. 130). No good points were found, but certain triangular fragments, of medium size, could have served, without modification, as reinforcement for shock or throwing weapons.

The scrapers, on the other hand, are very numerous, due as has been said, to retouching sometimes on cores (pl. XXXI, fig. 122), sometimes on thick flakes, and then willingly combined with the slicer (pl. XXXI, fig. 128). Finally the site offers many flakes of accidental shape, as well as some poor blades, made usable as scrapers by a slight modification or occasional retouching on the points which lend themselves to it.

Finally it is worth mentioning some special tools: a sort of tranchet coming from a wide hornstone blade with transverse retouching; the cutting edge shows traces of use (pl. XXXII, fig. 131). On the other hand, fig. 23 (in the text) shows a flake of hornstone, which, on one side has a beak delimited by two notches, one of which is due to a single removal, the other to a fine retouch. There are two similar pieces.

16. Nesseby 1I (Bjørkely).

U. O. Årb., 1928, p. 111. No. 48. C. 24214.

Continuing towards the west, about two hundred meters from Nesseby I and at the same height above sea level, we also found in 1927 some cut stones in a path that crosses a grove of birches. The site is located above fox cages on the Bjørkely farm.

As raw material, various quartzites of fairly good quality were used, as as well as hornstone, a little quartz, and siliceous stone. The material collected is not very considerable: 140 pieces in total, including a lot of useless waste. We also found one or two pieces of pumice stone, which however do not seem to bear any traces of use.

Two dozen blocks of various rocks must be considered as cores. They are generally exceptionally small; some do not measure

than 0.02m, in their largest dimension. Only two are 0.05m. The shapes are those found wherever cores are widely used: sub-discoid, or vaguely spherical. No bladed cores, with the exception of a few that provided very fine bladelets.

The other pieces are also very small. No large flakes of knapping and few good blades were found. Among the tools, those that could be used for scraping are in the majority, as usual. Mostly convex, rarely concave, they are obtained by more or less brief retouching on thin flakes of accidental shape, including two ovals; in addition two small blades have scraper retouches at the tip. There are no scrapers, no keel-scrapers or other thick scrapers. On the other hand, also at this site there are some non-typical cutting or scraping instruments, products of modification on the lower surface, often in conjunction with oblique removals on the edges.

Some blades and flakes have marginal retouching. Let us mention in particular the lower part of a strong blade of siliceous gray stone that has a complete dorsal flap, and in addition, on the lower face, a retouch on both sides of the bulb of percussion (pl. XXXII, fig. 132). Some other smaller blades are similar to those of Châtelperron, with more or less extensive retouching from the tip.

As at many sites, other triangular fragments have a rounded retouched back and somewhat resemble the type from Abri-Audi. But the pieces are overall very small−generally not exceeding 0.025m−and could very well serve as arrowheads. There are no tanged pieces.

We cannot affirm the presence of real burins, despite one or two doubtful cases, obtained by a burin cut perpendicular to an unretouched fracture, which does not allow a certain determination.

17. Skitnelv.

U. O. Årb., 1929, p. 184, No. 41. C. 24365.

Beyond the fjord, almost halfway between Nesseby and Vadsø, the Vestre Jakob River flows into the sea. Nearby are two other water courses, Skitnelv immediately to the west and Røverelv to the east. This area has a series of characteristic terraces, one at about 5m above sea level, another at about 10m, and two others, very steep at 28m (?) and 50m (see pl. II). Just west of Skitnelv, on the southern slopes of a hill, knapped stones were found in two places (I and II), at a height of about 40−50m. The terrace formation is undoubtedly less characteristic at the location of the finds, but we can affirm with certainty that traces of site exist between

the highest and next-highest terraces, one of the sites being just below this one.

The old ground, a beach composed of small flat water-worn cobbles, was partly exposed, partly covered by a thin layer of earth. The antiquities were found, some on the surface, others by digging here and there over a fairly large area. Overall, the objects were few and scattered. The site is called Skitnelv. On the lower terrace, objects from the Neolithic period were collected.

The artifacts, − 57 pieces in all, − come from two places (I and II); the second, however, only provided three cores. We will describe them together in this presentation. As raw material, mostly quartzite was used, also a little oolitic flint, hornstone and quartz. These rocks, for the most part, were in the form of cobbles, as seen in several pieces by the remains of the original polished surface.

Implements. — We found a dozen cores or remains of cobbles from which blades or flakes had been removed. As usual with these sorts of rocks, the shape is irregular, sometimes almost globular. One or two pieces must be cataloged as discolds; another, smaller, with a flat heel, was cut in such a way as to present a lively and sinuous edge, like a sort of discoid biface. Most of these cores were reused as scrapers of varied and sometimes irregular shapes, reminiscent in some cases of keeled scrapers. Some, following repeated removals, have, at one of the ends, a sort of scaled edge. A thin flake, with abrupt facets on part of the perimeter, must come from the sharpening of a core-form or keeled scraper.

A little more than twenty blades are of poor quality. One of them has retouches on one edge, on the lower face, and on the other, small chips (pl. XXXII, fig. 133). A fragment of a beautiful blade has an ordinary blunt back (pl. XXXII, fig. 134). Two others are adapted to the finger by retouching near the bulb of percussion (pl. XXXII, fig. 135). Two others have been retouched slightly near the tip, perhaps into scrapers. Finally we must mention a blade (or flake), small and wide, cut into a triangular point, with a flat retouch on the upper face; it has also undergone retouching along the back, on the splitting plane (pl. XXXIII, fig. 136).

Among the flakes, one or two show, on one edge, elongated retouches, like small scrapers. Several have been slightly retouched as scrapers, for the most part poorly fitted, sometimes also with retouching on the plane of the splitting (pl. XXXIII, fig. 137). Many affect the shape of burins of various types, but due to the

raw material it is not possible to say, for the most part, that these shapes are not accidental.

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18. Røverelv.

U. O. Årb., 1929. No. 53. C. 24377.

On the other bank of the Jakob river, very close to Røverelv, a path goes up and crosses a birch woods. In 1928, in the path itself, remains of worked stones were found at the top of a slope about 40m above sea level. The antiquities were collected from the surface; also some excavations were made. The site is called Røverelv.

The material is not very considerable (139 pieces in total, including a lot of waste). It is made of quartz and quartzite. A single flake of reddish quartzite appears to have been rolled or worn by water. As usual, it seems that cobbles were used, the polished surfaces can still be seen in places.

Implements. — Two cobbles, one of quartz, the other of a gray-blue quartzite, were highlighted by rough and irregular removals on both sides. This results in instruments of shock, a sort of punch or sharp striker. The length of the pieces is 0,079m (pl. XXXIII, fig. 138), and 0.081m.

The site does not have any good cores, with the exception of a single, medium-sized quartzite core, which is knapped into a triple scraper. But there are some small sub-rectangular pieces, of quartz and quartzite, that resemble cores. As far as the raw material allows one to judge, they appear to be chipped tools. Like everywhere, there are many scrapers. More than two dozen were found. Of this number, two are shaped from fairly large and very thick fragments of rock; they have been retouched at the tip and resemble the careened scrapers. Others are in the form of flakes of some sort, which generally have undergone very limited work. In only a few cases, there are fairly extensive retouches at the edges. There are also ovoid or round pieces (pl. XXXIII, fig. 139). One of them, with a faceted edge, seems to come from the sharpening of a core (fig. 22 d).

A large number of flakes imitate the shape of the burin, which is undoubtedly fortuitous in most cases. The piece in fig. 140 (pl. XXXIII) is almost certainly a double burin.

19−20. Tomaselv I and II.

I. U. O. Årb., 1928, p. 109, No. 44. C. 24210.

II. U. O. Årb., 1928, p. 107, No. 41. C. 24207.

Near Tomaselv (the Thomas River), not far from Vadsø, Nummedal found traces of sites in two places in 1927.

The site called Tomaselv I is located at the top of a strong terrace the west of the river, between the path and the sea. This terrace, whose height

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Fig. 24. Tomaselv II. Flake of quartzite with flat retouches on the upper face (point?).

maximum above sea level is 28 meters, must date from the time of the sea at Tapes. On the surface only a few very uncharacteristic pieces were collected (8 in total), of quartz and quartzite: a small rectangular quartz core; a thick block, also of quartz, knapped on both sides along one of its edges, with a cutting edge in the form of a "chopper"; a small thick plate of dark quartzite rock, retouched as a scraper; a short blade of the same material, blunted at the point; a thin flake of quartz that may have been retouched into a triangular backed point; two medium-sized flakes, of quartzite, knapped on both sides, probably scraping or scraping tools; finally a small chip of quartzite that forms, undoubtedly fortuitously, the shape of a burin.

The site Tomaselv II was discovered the same year east of the river. It is located on a moraine ridge, below the skiers' hut, at an elevation of 50 to 60m (measured with an altimeter barometer). The antiquities were collected on the surface or by excavations in various places.

The material, which is not very important, includes various quartzites, quartz, and rock crystal and a few pieces of good dark flint. It comes more or less from cobbles whose polished surface can still be seen in places. Three knapped pieces of quartzite appear to have been subsequently rolled or worn by water. The hornstone provided a fair number of blades and small flakes, but almost no characteristic instruments.

Implements. — There are only five cores, discoid or sub-conical in shape. One of them is thick and made of quartz, and has undergone removals on both sides, which have in one place the character of quite fine retouching; the result is a sharp edge that we have already noticed on these pieces. Here it is rather used as a scraper.

The scrapers are represented by a few pieces, coming from more or less thick flakes, knapped very roughly for the most part; except for the scrapers that are combined with notches, perhaps due to a single

blow or a fracture, but certainly intentional (pl. XXXIII, fig. 141). Two triangular flakes, quite thick, are knapped on the edges, like sort of points ("Halbkeil"), or rather perhaps like double scrapers (fig. 24 in the text).

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A large number of small flakes and blades of varying quality are made of hornstone. Shards and blades have traces of use or chips, which can take on a denticulation character. One or two blades have slight regular touch-ups on the edges.

21. Stykket.

U. O. Årb., 1928, p. 107, No. 42. C. 24208 and 1928, p. 108, No. 43. C. 24209.

In the vicinity of Vadsø are many sites, all discovered in 1927 and studied in the same and subsequent years. One of them is located just west of Prestelv (the "Priest River"), which forms the western boundary of the town. Near a cultivated marsh, which is called Stykket and belongs to Osvald Methi, there is a moraine ridge that extends towards the east into a rounded terrace, which is certainly a marine beach. Over a fairly large area on the ridge debris of cut stones was observed. Quite poor and uncharacteristic material (59 pieces in total) was collected, either on the surface or by excavations at various places. The site is located at about 30m elevation. A terrace (Tapes shoreline?), called Raet by the locals, is 28m above sea level.

As a raw material, little quartz was used; instead are various quartzites and quite often a dark colored flint. There are only two pieces of hornstone. Most probably cobbles from the moraine were used On many pieces, we find in places the polished surface of the cobble. In addition, a very small hammerstone was found, made of an elongated quartzite cobble, with the usual traces of crushing at both ends (pl. XXXIII, fig.142). It weighs only 67 grams.

Implements — The cores number around a dozen. One, of quartzite, of 0.085m in length, and another, very small, of only 0.025m, of dark flint, must be characterized as real discs that produced flakes. Among the others, some are irregular; the rest, of flint and quartzite, have elongated shapes and provide blades. All are more or less used; some so much so that a sharp edge has formed at one or both ends. The striking plan of the cores at the site are sometimes faceted, sometimes not. Among the fragments, some with a retouched strike surface, must come from the core-form disks with a prepared strike surface.

Here again, some cores, or pieces of rock resembling cores, have been roughly and hastily cut into scrapers.

The blades are very few in number, despite the fairly large quantity of cores that must have provided them. There are undoubtedly none that have been shaped into tools, with the exception of that in fig. 143 (pl. XXXIII) retouched on the back, and

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broken or crushed at the tip. The same is true of a small blade, with notches on both edges, forming an atypical groove. On the other hand, tools in the form of small chips are quite numerous; as usual, these are mainly scrapers made from flakes of any shape, that have been made usable by some crude retouching or by interesting retouching of part of the perimeter. Often, the flakes were knapped on both sides and thus formed multiple tools. For example, the piece in fig. 145 (pl. XXXIV) is retouched with a scraper at one end, with a concave burin chipped by use on one of the edges, and, at the other end, a sort of beak produced by two blows made obliquely on the plane of fracture; one of these blows removing the bulb of percussion.

Fig. 146 (pl. XXXIV) shows a large thin flake with fracture on both opposite edges that caused most of the bulb of percussion to disappear. The back (at the bottom of the figure) has received retouches, too sharp to be an modification for the hand and not quite similar to the retouching of scrapers. The opposite edge offers a natural cutting edge, which bears traces of use. A very thin flake, fig. 147 (pl. XXXIV) is retouched as a scraper on one of its edges, and on the other edge has chipped notches; it has, moreover, been retouched as a scraper on the percussion plane (b). This last trait is found on other flakes of the site. Finally, let us point out a triangular flake that has been slightly adjusted at the point, in particular by a fine retouching (pl. XXXIV, fig. 148); another small flake has been retouched into a triangular point with a back where the base is perhaps crudely adapted to be mounted. On this subject, let us cite a flake of gray quartzite, 0.094m long, that is cut into a point on both sides at one end, like a crude piercer or a sort of striker, analogous to the three pieces of Storbukta (see pl. LXXXIV, fig. 357). We cannot be sure that there are real burins, but half a dozen used flakes more or less resemble their shape (pl. XXXIV, fig. 149, 150).

At the edge of the moraine ridge, in the direction of the marsh, there was a depression of an area of 4 to 5m2, roughly resembling the foundation of a cabin. We explored 2 or 3m^2 of it. First, we found a layer of 0.30m of coarse oxidized sand without antiquities; below an archaeological layer of about 0.20m containing

carbon. It contained small pieces of burnt bones, some tools and waste quartz, quartzite, and flint. The objects collected break down as follows: two small, atypical scrapers; a small flake cut at one end like a sort of gouge, and a short quartzite blade, with a fairly flat dorsal retouch at the point, like a knife. Finally, an ordinary cobble was used as a hammerstone, and a sandstone plate as a whetstone.

All of these pieces are not characteristic, but the whetstone appears to belong to the Recent Stone Age.

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22. Skytterhuset.

U. O. Årb., 1928, p. 106, No. 40. C. 24206 and 1931−32, p. 242, No. 136. C. 25216.

Skytterhuset (the shooting barracks) is located about 1 km north of the town; To the west of the barracks extends a new moraine ridge, at an elevation of 52 to 59m. It provided pieces that were found either on the surface or by digging to a shallow depth. There are 77 in total, including waste.

As raw materials, mainly various quartzites, a little flint, very little quartz, and hornstone were used. A clear quartzite yielded 10 pieces that appear to have been rolled or worn by water. Everything probably comes from cobbles found in the moraine itself.

Implements. — Two dozen cores, made of quartzite and flint, have uncharacteristic shapes. Some are simply cobbles from which flakes have been extracted; others are ovoid, almost globular, sub-rectangular, etc., depending on the chance of the removals. Several have undergone certain alterations as very simple scrapers; others have sharp edges or corners, which could be used to scrape or scrape. Besides these real cores, we must mention half a dozen scrapers that generally were modified by crude retouching at the ends of thick flakes, plates, or pieces of rock; their shapes are more or less reminiscent of keel-scrapers. Figs. 25a, b (in the text) show two pieces, one of which is the largest of the scrapers at the site. Finally, let us mention an enormous core (019m x 0.11m x 0,08m), knapped all around its circumference, which is due, in part no doubt, to flake removal. At one of its ends, it is cut like a gigantic keeled scraper (see pl. XIX, fig. 60).

The blades are few in number, undoubtedly due to the primary material. As tools on blades, there are only three knives with turned backs (fig. 25e), and perhaps an angle burin. On the other hand, there is a large number of large irregular blades and medium flakes, the size and quality of which exceed those of the cores of the site. Their striking surface is plain or faceted. The could easily serve as tools or points for example, without modification,; and, in fact, we sometimes see traces of use there. For example, a rather thick triangular chip, that has a natural edge on one side, with a host of small usual chips, like a sort of tranchet. A small number of flakes have been converted into real instruments: one or two into atypical scrapers, and two, by extensive retouching, into small convex scrapers. A quartzite slab, in the shape of a half-moon, with long irregular retouches alternating on the two edges, is certainly a double scraper (pl. XXXV, fig. 151). Several pieces have large notches, most likely intentional, due to removal

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Fig. 25. Skytterhuset. Two scrapers and a blade with blunt back. Quartzite. Natural size.

or reworking, and never to regular retouching. The thick flake of quartz shown in fig. 152 (pl. XXXV) is one of those that seems worn by the action of water; it has two intentional notches, resulting from crude removals; similar removals also make the point into a sort of thick scraper. Fig. 153 (pl. XXXV) shows a fairly thin flake of gray quartzite; it was retouched as a scraper; in addition it received two notches between which there is a burin.

23−26. Melkevarden I−IV.

I. U. O. Årb., 1928, p. 103, No. 36. C. 24202.
Ibid., 1931−32, p. 242, No. 135. C. 25215.
II. Ibid., 1928, p. 105, No. 37. C. 24203.
III. Ibid., No. 38. C. 24204.
IV. Ibid., No. 39. C. 24205.

A short distance to the east of Vadsø there is a rocky hill called Melkevarden. It has a trigonometric marker at its summit, at an elevation of 120m. On the west slope, which is quite steep, there are small moraines and a series of rocky ridges that provide good shelter from the wind. There, Nummedal found antiquities at three different places, located respectively at 60, 57 and 54 meters above sea level (according to the altimeter barometer). The ground is now covered with a layer of peat, under which the objects were

collected in the sand at a depth of about 0.30m. In total, around 20m² were explored. These sites are called Melkevarden I, II and III, and will be described separately, although is not justified in seeing serious differences between them.

South of Melkevarden, on a small cape, another site was found at about 60m elevation. It is called Melkevarden IV. The ground is formed by a hard moraine, covered with a thin layer of brier earth. The artifacts were grouped there in an area of about 5m².

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Melkevarden I (60m above sea level) provided a total of 70 pieces. As raw material, a fair amount of varied gray quartzites was used, usually coming from cobbles taken from the moraine; then, and in lesser quantities, flint and hornstone. Two simple oval cobbles made of quartzite were crushed or cut at the end or on part of the circumference allowing their use as hammerstones (weight: 525 and 310 grams). The largest (pl. XXXV, fig. 154), in addition to crushing at the ends, offers on both flat sides, some sort of irregular, shallow cups, a detail that is found on these instruments throughout the entire Stone Age. Perhaps these cups were used for fitting.

Implements. — The 70 pieces collected include two dozen quartzite and flint cores; only one of hornstone. The forms, here too, are varied; however there is no globular core as provided mainly by quartz. In addition, there is a small disk; others are of varying contour, sub-discoid and slightly elongated; finally there are some cobbles from which removals were carried out in suitable places. Let us repeat here that the cores are smaller than the majority of flakes and blades at the site. This must be due to a lack of reasonable raw material. One pushed to the extreme the use of really good rocks, as can be seen on two dark flint cores, from which blades were cut as much as possible (pl. XXXV, fig. 155). As everywhere, some cores or fragments of core-shaped stone have been roughly cut into scrapers that are more reminiscent of "keep" scrapers than true core-shaped scrapers. Sometimes, discold cores were retouched into scrapers, after having undergone prolonged knapping and thus taken on the false appearance of scrapers or flakes (pl. XXXV, fig. 156). This last piece was roughly made into a double scraper, with alternating retouches on both sides.

Regarding the core, let us cite the instrument in fig. 157 (pl. XXXV). It is a piece of quartzite cobble, the polished surface of which is still found on almost the entire rear side. The face that we see in the figure has undergone gross removals which, in part at least, are due to the knapping of flakes. However, towards the point we observe three or four slight removals that are not due to knapping or impact, but to intentional sharpening. The piece should be considered something of a punch, even if the flake is rough. It is perhaps an instrument of the same nature as shown in fig. 158 (pl. XXXVI); it is a thick flake taken from the surface of a quartzite cobble. The lower face is formed by the unworked fracture plane; the upper face is cut regularly on both edges, towards the tip, and has only undergone a rough modification at the top. Despite this rough flake, the piece is somewhat reminiscent of certain samples from the Micoquian, in France.

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One found a little more than a dozen blades, of different qualities, almost all without traces of modification. There are only three real tools: a small blade; a short, wide blade with slight retouching on one edge (knife?); and finally, a slightly smoothed blade near the tip, perhaps to be a piercer, fig. 159 (pl. XXXVI).

Among the larger flakes, were two or three of elongated (sub-rectangular) shape, cut on both sides and provided with a cutting edge at one end, in the shape of a hatchet (pl. XXXVI, fig. 160). Two other thin flakes, knapped on one side, have the shape of points (pl. XXXVI, fig. 161); a flat flake has been knapped on both edges in the shape of a scraper (pl. XXXVI, fig. 162). We must undoubtedly see a sort of heavy and crude scraper in the fig. 163 (pl. XXXVII); this large thick plate, with a large bulbous fracture plane (on the lower face) that forms an obtuse angle with the striking plane, was roughly cut on both edges and at the tip.

What distinguishes the equipment of this site is that there are hardly any scrapers retouched on flakes or blades. Besides the thin discoid pieces that we have cited (fig. 156), a single discoid piece could be mentioned (pl. XXXVII, fig. 164). But the groove that we observe here on the convex edge, to the left of the figure, is undoubtedly due to removals carried out on the core (discoid), before the piece has been knapped by a blow whose bulb still exists at the top of the rear face. There are no real burins either, although some fairly large flakes have received a sort of burin blow on an angle or a thick fracture (pl. XXXVII, fig. 164, 165). One flake of flint has the shape of a burin on a pointed blade (pl. XXXII, fig. 166).

The Melkevarden II site is fifty meters away, barely further than the previous and at an elevation 3 meters lower. Only a quartzite core of medium size cut like a scraper and five flakes of the same rock were found; two of them have a removal that resembles the burin cut that we spoke about in connection with the Melkevarden I site. Let us also mention a flake and two hornstone blades, one of which is quite roughly

retouched on one edge, at the lower side.

Melkevarden III is a site located further south, about 40m away and at an elevation of 54m. The collection here too was quite meager. Three thick cores of quartzite and flint were found, which appear to have been retouched into scrapers. A piece of quartzite, with flat removals, must have originally been a disc used to the extreme, which took the form of a sort of palette with several cutting edges which may have served as cutting and perhaps scraping tools. A small and large flake, made of quartzite, is cut on both sides into a cordiform or sub-triangular (arrow?) point (pl. XXXVII, fig. 167). Another little flake,

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thick enough, has undergone knapping towards the tip, perhaps to make a piercer. A thick flake of dolomitic flint affects the shape of the burin on the fracture angle. Two smaller flakes of hornstone and another, of black oolitic flint, bear serious chips at the edge, perhaps also retouching. Chips and crushing on the edges, due to use, is also present on five chips of quartzite. These are small or medium pieces, with semi-"Clactonian" knapping.

Melkevarden IV provided a total of 224 pieces, the vast majority comprising small flakes and waste, also small or very small. The material used is mainly hornstone, which is extremely weathered; also a little quartz (24 pieces) and very little dark flint (9 pieces).

The number of intentionally modified tools is very limited. There are only two cores: one, of quartz, of elongated shape, provided beautiful lamellae; the other, of hornstone, produced fairly small blades; its shape is irregular; perhaps it was used as a scraper. It is shown in Stone Age Finds, pl. LI, fig. 236. In addition, more than a dozen pieces have one or two sharp scales. Unlike what happens in other sites, few of these parts are cores, but mostly flakes. Some of the flaked parts seem to be before the knapping, others after. Two pieces, the second of which is very characteristic, are shown in Stone Age Finds, fig. 240−241.

A small number of scrapers, roughly retouched, were shaped on flakes or on pieces of blades (Stone Age Finds, fig. 243, 244). Among the blades used, only one has undergone an abrupt retouch on the back, near the tip; on the opposite edge it has chips, undoubtedly because it was used as a knife (Stone Age Finds, fig. 238). Finally, a blade was fitted into a burin at one end (Stone Age Finds, p. 237).

Sites near Vardø.

These sites are grouped, some near Ytre Kiberg, a fishing village a little south of the town of Vardø, the others in the town itself or on the nearby shore of the land.

27. Sletta (Ytre Kiberg I).

U. O. Årb., 1933−34, p. 79.C. 25464

This site was discovered by Nummedal in 1932. It is named after an abandoned whale fishing station that is located a little west of Ytre Kiberg. It is located on an open terrace, a short distance from the shore, and at an elevation of about 30 to 40m. There are other terraces a little further up. Some of the artifacts were collected on the surface, others at a depth of only 0.15m.

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Fig. 26. Sletta. Double scraper on a thick flake with lozenge cross section. Quartzite. Natural size.

There are 30 cut pieces, including a core and five small flakes of quartz, gray quartzite and flint; the rest is taken from a red-brown quartzite sandstone, that is found in most sites on the Varanger Peninsula. Also at this site it is obvious that cobbles from here or nearby were used.

The material collected includes six blocks that appear to have been prepared as cores and that also served as such. One of them is globular, of relatively small (diameter: 0.046m x 0.052m). The largest has a discoidal shape (0.120m x 0.065m); it is knapped from a cobble and has a semi-circular edge crushed in places, probably after having served as a "chopper" (or as a hammerstone?), perhaps as a result of impacts against the anvil. Among the others, an elongate block provided at least one good blade. The rest has a more accidental form. One block seems to have been cut into a double scraper, like a sort of "keel" scraper and to have even undergone sharpening.

A small number of fairly good blades have been used in their natural state. There are no retouching tools on blades. On the other hand, five thick flakes were modified into coarse scrapers. They are all multiple tools that offer several parts suitable for scraping or scratching, sometimes a scraper combined with cutting parts obtained by retouching on the upper and lower faces. Fig. 168 (pl. XXXVII) shows a sub-rectangular flake, cut like a scraper at one of its ends, and with a zig-zag edge at the other end, made by alternating blows. Knapping, as is often the case, caused the striking bulb to disappear.

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Among the other tools, two have the shape of burins, and one of them (pl. XXXVIII, fig. 169) seems to have one at each end.

Fig. 26 (in the text) shows a thick double scraper that comes from a flake roughly retouched on both edges. On the lower face it has a rounded edge in the middle so that the section of the artifact is rhomboidal; the two opposing scrapers thus each have a flat lower face that form an angle with one another. The lower face also has small lengthwise removals at the end, probably a scraper modification.

28. Olahaugen (Ytre Kiberg II).

This site was discovered in 1934 by the author. It is located a little to the side of Sletta, between a hill called Olahaugen and the Lillemyra ("Little Swamp"), at an elevation of 40 to 50m. It has a rounded terrace with a bare cobble surface where there were many wastes of knapped stones, especially quartz and red-brown sandstone. No excavations were carried out and only a few pieces were kept as samples, including a red quartzite "chopper" (pl. XXXVIII, fig. 170) and a core used to the extreme and which took the shape of a sort of round biface (pl. XXXVIII, fig. 171).

29. Molvika (Ytre Kiberg III).

U. O. Årb., 1933−34, p. 79. C. 24565.

The site was discovered by Nummedal in 1932. It is located on the path from Kiberg to Vardø, just opposite a small bay, Molvika, which gave its name to the site. The path climbs very slowly from Kiberg and there must once have been a shallow bay there. However, starting from Molvika the slope is steep. On the plateau near the site two enormous terraces form a semi-circle between Molvika and the path, then continue on the other side of it. The highest rises up to 55m above sea level (using the barometer). The site is located between the two terraces at an elevation of about 50m. The artifacts were collected on the bare ground or by digging here and there.

The material, of various quartzites, is quite limited (48 pieces in total). In addition there are two pieces of quartz, one of rock crystal, some black flint and a few pieces of a slightly lighter color that bear a striking resemblance to chalk flint. This type of rock is only found at the Lafjordstua site, and, for one or two samples, at the Kirkenes train station (Jernbanestasjonen). Finally there are two blades of a red-brown quartzite sandstone that is often found at the following sites.

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Eight pieces can be characterized as small globose shaped cores, elongated or irregular. One does not see real discs. As usual, some parts are reworked into scraping or scraping tools on the parts that were suitable for it (pl. XXXIX, fig. 172). Likewise, the cores are smaller than many of the blades and flakes of the site. The blades are relatively numerous. Two dozen are of good quality, and several have signs of use on the edges. Three blades, one of which has a chipping notch on both sides, are finely retouched into scrapers at the tip. The biggest is shown in fig. 173 (pl. XXXIX).

One or two flakes were also retouched into small scrapers. From flakes, there is one that resembles the Campignian tranchet; it was cut on one edge; the other is a natural cleavage plane. A triangular flake was roughly made perhaps into a point, rather like a sort of scraper (pl. XXXIX, fig. 174). Two very thick flakes are roughly cut into scraping instruments. We show the largest in fig. 175 (pl. XXXIX), a multiple tool, which in addition to a transverse scraper at one end, has at the other end a sort of beak or muzzle, produced by two notches; it also has cut notches on both edges.

There are at least four burins. One is a thick corner burin, combined with a convex scraper; the other three come from long flakes or blades (see pl. XXXIX, fig. 176). The bevel results from a burin stroke parallel to the length of the blade, and from a transverse, oblique retouch on the back of the piece.

30. Vardø city I and II.

I. U. O. Årb., 1930, p. 217, No. 42. C. 24546.

II. Ibid. No. 43. C. 24547.

In Vardø, without leaving the town, Nummedal in 1929 found traces of sites at two different places.

The one (I) is situated in a valley east of the town's water reservoir at an elevation of about is 30m. Only four pieces were collected there; a small rectangular flake of gray quartzite that seems to have been rolled or worn by water; a small blade and two large flakes of the red-brown quartzite that we have already mentioned at Kiberg. One of these flakes is cut on both sides and has, perhaps fortuitously, the shape of a burin.

The other site (II) is located at the top of a hill, opposite the shooting range. There too, there were only faint traces of tool making. The collection consists of 13 pieces of quartz, quartzite, and a dark colored flint. These are small flakes, mostly waste, with the exception of a small used quartzite core. A few small pieces of charcoal were also found.

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31. Smellroren.

U. O. Årb., 1931−32, p. 224, No. 72. C. 26151; 1933−34, p. 80. C. 25468 and p. 172. C. 25836.

The site takes the name of a small fishing station located on the mainland a little north of Vardø, on the other side of Bussesund. A small stream ends a little to the south of the group of houses. The land going up the stream is quite flat and there are areas covered with fine sand. Near the stream at an elevation of about 20m the remains of the Neolithic era were found. Above, the land rises towards some terraces that are undoubtedly composed of moraine debris rolled by the sea. On these terraces a site was discovered in 1931 at an elevation of 30 to 40m. It covers a large area, several dozen acres, but seems to be richer in the lower part. The site is exposed to the southeast wind, but otherwise is well protected by rocky ridges (see Plate III).

Nummedal worked there four times, in 1931, 1932, 1933 and 1934. Each year, he brought back significant material that included a total of several hundred knapped stones. This number could have been multiplied many times, because this vast space is dotted with very visible cut stones. During one morning in 1934 he collected more than a hundred, and a careful search would yield tons of material. Currently, these finds are, by their mass, the richest in Finnmark and they are large enough to give a fair idea of the site, the civilization it represents and the technique of the instruments.

At Smellroren, a red-brown quartzite was mainly used. It is good, very consistent, bursts well and was able to provide a fairly large quantity of good blades. This rock was perfectly suited for fairly large and coarse tools. This is a place on the Varanger Peninsula; but as most of the pieces collected have retained the polish of their original surface, it is obvious that they come from cobbles found on site or in the nearby moraines. This excellent raw material must have been available in enormous quantities, and this is undoubtedly, along with the proximity of a sea very rich in fish, one of the reasons why people stayed there. The other rocks play only a secondary role. However, we find a little dolomitic flint, a little hornstone and various gray and light quartzites, especially in the form of very small waste. But even though in one case all was collected, the number and mass are relatively insignificant.

Implements. Cores.— Smellroren offers at least fifty pieces that can be characterized as real cores or reused cores. To this number are added some small blocks of flint that will be discussed later. The cores of

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quartzite are generally of medium or fairly large dimensions, and are from 0.07m to 0.12m in length; but there are also some exceptionally small ones, one for example that only measures 0.043m. However, blades and flakes were found that come from cores much larger than those we possess. In this mass of cores, only two can be characterized as elongated cores (rectangular in outline), prepared to provide blades, although we have a fairly large number of blades of satisfactory size and quality. The others must be characterized as discoid cores, sub-discoid blocks or originally discoidal cores; as for the blades, they must in large part come from similar cores or directly from cobbles that have been properly modified.

The Smellroren cores have to a certain extent the shape that the raw material presented. As has been said, they largely originate from cobbles of suitable size. But these cobbles were already more or less angular; they were already, in reality, cores offering one or more faces usable as a starting point for knapping: or else a slight modification was enough to make them usable. It’s a process that you can follow step by step. And several cores, well prepared and used, still bear more or less extensive traces of their original polished cobble surface.

When the cores were subjected to more extensive preparation, it seems that the knapping proceeded in two ways.

1st One arranged one or more striking planes, perpendicular to the direction of knapping, just as for flint works in the Paleolithic of western Europe. For this, one resorted to a single large removal large enough to allow several less significant removals, to more or less prepare the striking plane. Both processes are recognizable on the cores; this results in plane or faceted striking surfaces that we find without much difference on the flakes and blades of the site. Cores of this kind, whether they are still almost cobbles or whether they have been knapped over their entire surface, are clearly similar to the Mousterian discs. But good samples are extremely rare, because most of the cores were used to the extreme and were reduced to the state of quite small pieces, more or less flat, which were then often used or reused as scraping or scraping tools. (pl. XXXIX, fig. 177, pl. XL, fig. 178), probably also as blunt tools. What seems to indicate this is that

four or five of these pieces are provided with a spur (pl. XL, fig. 179) or a sort of beak, obtained by retouches made starting from a transverse fracture plane, give the piece an appearance of core-form scraper (pl. XL, fig. 180).

2nd The other process consists of knapping on both sides of the block to provide an edge on either side of which blades or flakes are cut

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alternately. The result was two more or less flat, faceted faces, the meeting of which forms a more or less acute angle, with a sinuous cutting edge that resembles, and sometimes is identical to, that of a chopper. When these parts are very used, they become tools that can without hesitation be considered as handaxes, of ovoid or discoid shape (pl. XLI, fig. 181); there is no doubt that they could provide excellent service as scraping or percussive instruments.

Most of the Smellroren cores were used in different ways, by knapping starting from several striking planes, retouched or not, or by knapping starting from a sinuous cutting edge. Fig. 182 (pl. XLI) shows the beginning of this use; the piece has both a faceted striking surface, which has served as a starting point for the removal of a small flake (fig. b), and a peripheral edge, from which short blades were cut on either side (very visible at the right in the same figure). Prolonged use gives these pieces an irregular shape, which however, due to the raw material, tends towards the globular shape; at the same time, it goes without saying, they decrease in size.

The result of this complicated method of knapping is a set of fairly heterogeneous cores that for the most part must have also been used as scrapers, without retouch or with slight modification. This remark also applies to the thicker cores that are sub-globular in shape. It is also very likely − although difficult to prove − that these pieces with sometimes quite sharp edges were used for percussion or crushing. As has already been mentioned, some are real slicers (choppers), which the conditions of work and food then made essential, in particular for breaking and crushing bones, but whose use cannot be positively highlighted.

Handaxes. — In addition to the tools that we have just mentioned and which have, to a certain extent, the character of makeshift tools, and cleavers and tranchets that we will talk about later, we see a selection of large percussion instruments, real handaxes cut from large blocks, cores or cobbles. Sometimes, of course, the purpose of a piece can be questionable. This is the case, for example, of the tool in fig. 183 (pl. XLII), which resembles a core disk and could very well be one, but which is in reality a two-sided punch, the widest end of which forms a sort of axe. The piece of fig. 184 (pl. XLII) is more certain: it is roughly cut on two sides, with a narrow edge, sharp and undoubtedly used at the tip. Let us then point out, in fig. 185 (pl. XLIII), a piece whose heel is carefully adapted for gripping, but whose tip is poorly fitted due to a natural accident of the rock. And if these parts seemed doubtful, we would refer to figs. 186 (pl. XLIII) and fig. 187 (pl. XLIV), which, like the previous ones, are shaped on cobbles of suitable shape and size, as is usual

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everywhere in primitive ages, especially when one had to resort to quartzite cobbles, due to lack of flint. The first tool (fig. 186) is a flattened cobble that has been cut on both sides of its perimeter and has undergone fine retouching at the tip, the lower side remaining intact. The back suffered one or two removals, which perhaps were caused accidentally by a shock against the anvil, during modification of the point. Here, the form and the technique leave no room for doubt: the instrument is certainly an amygdaloid punch, the quality of which compares well with that of the quartzite industry in the south of France. The tool in fig. 187 shows the same quality, with the only difference being that it comes from a thicker cobble and consequently underwent a more extensive cutting, which however was not completed when the piece was thrown away, we do not know why. The tip is fairly blunt and still retains its original polished surface. Throughout this site, but not elsewhere, we see small crushings that must be the result of shocks against the anvil, during the knapping of the piece, and not of a use of the piece as a striker.

Flakes and tools derived from large flakes. — Given the primary material of the site, it goes without saying that it is extremely difficult to distinguish medium-sized flakes, and the tools that come from them, from real blades and tools derived from blades. For now we will only talk about tools derived from large flakes.

There is no doubt that the red quartzite of Smellroren was well suited to the knapping of small and large flakes of the desired shape. Very many of them were collected, but only those that really merited examination. The dimensions vary and can reach up to 0.19m (pl. XLIV, fig. 188, pl. XLV, fig. 189, fig. 27 in the text). As we said above about the knapping and the way of treating the block, there are here about as many flakes of retouched striking surfaces as plain striking surfaces. In the latter case, the angle formed by the striking plane and the fracture plane is often very obtuse and sometimes presents a large bulb of

percussion (fig. 27 in the text, pl. XLIV, fig. 188). There are thus flakes that could be compared to Levalloisian or Clactonian flakes. As the numerous chips on the edges show, these long and strong flakes could very well have been used as tools or hand weapons just as they are. Some are reworked into percussion instruments, like real punches (pl XLV, fig. 190).

We also see a more complicated use, which however hardly changes the character of the flake. Thus we see in fig. 191 (pl. XLV) a long flake of 0.125m that bears − in addition to transverse retouches which made the bulb of percussion − scrape retouches and notches along one of the edges, and also, at the tip, some crushing due to impact. Similar chips − with notches, lighter retouches, chips or crushing due to

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Fig. 27. Smellroren. Large flake with an unretouched oblique striking surface, and a large bulb (c) that is partially removed secondarily (a). Red quartzite. About 1/2 natural size.

usage − are not very rare (pl. XLV, fig. 192. Cf. pl. XXXI, fig. 125) and there is no doubt that we are dealing here with a use of flakes similar to that which characterizes certain groups of Mousterian civilization.

Another curious and characteristic feature of Smellroren is that many flakes are knapped on the lower side. We are not talking about differentiated tool series here, which will be discussed more later, but large flakes that have undergone a more or less rough adaptation to meet an immediate need. Most often, this sharp edge concerns the part of the flake that carries the bulb of percussion, which has disappeared totally or in part, as is also the case for better shaped instruments coming from flakes. In other cases, it is the edge of the blade, or more rarely its tip that has been modified, almost always very roughly, by some crude removals or irregular local retouching (pl. XLVI, fig. 193). Very often these retouches are arranged in such a way that it results in a sort of biface cutting edge. Frequently, the useful part of the tool is obtained by a single significant removal, the result of a blow to the edge of the flake, and obliquely in relation to the plane of the lower face. Thus was obtained a more or less sharp edge without retouching that was perfectly suitable for cutting or shaving. It seems in particular that this way of proceeding commonly produced concave notch-shaped edges: there are at least three on the thin flake in fig. 194 (pl. XLVI). In many cases, however, the cutter includes a large part of the edge or circumference; finally, we

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also note invasive retouching of the entire fracture plane, with the result that the piece has a superficial resemblance to a very used core (same fig.).

What do we suggest there? It is not always easy to tell in each case. Obviously, the sharp parts thus produced were perfectly suitable for scraping or scraping. In other cases, it seems that the intention was to obtain a cutting instrument or a percussion tool. There are also other pieces with partially retouched edges that could very well be characterized as slicers (choppers). Naturally, it is quite impossible to establish clear distinctions between these tools of a provisional or fortuitous nature, and the many more convenient tools, of which we will now speak.

Tools formed from thick flakes.— We will understand from the above that scraping or scraping tools are very numerous at this site, even if we do not take into account the rather fortuitous instruments that we have indicated. True flake scrapers are relatively rare. Here, the scrapers are represented mainly by reused cores, then by a few small scraper blades, which we will talk about later. In addition, we find a certain number of elongated flakes or more or less large blades that have suffered an abrupt retouch on the strike surface, such that the bulb of percussion has been damaged or even disappeared. Two instruments, particularly large and coarse, coming from elongated flakes, are shown in figs. 195 and 196 (pl. XLVI, XLVII). This retouch is always oblique and truncates the plane of fracture of the piece. The opposite face, which becomes the lower face of the scraper, has almost always undergone one or more removals along the length, making the edge of the scraper sharper. Obviously, these removals were carried out before the manufacture of the scraper, sometimes even before the knapping of the flake. However, there is here for these tools from Smellroren and other sites, a detail so often repeated that it is necessary to see intentional modification or anticipated preparation of the scraper. These tools are reminiscent of, and sometimes even look exactly like, Leakey's "sinew spawners", first recognized in the Aurignacian of Africa, but also represented in the Upper Paleolithic of Western Europe.

There are actually quite a few scrapers that can be categorized as known. Some that were made on thick and elongated flakes with abrupt retouch in the shape of a half-moon at one of the ends can be characterized as kinds of keel-scrapers (pl. XLVII, figs. 197 and 198). Others, obtained by retouching a projecting part of thick flakes, are more like a sort of plane, although the retouching is long, of a Mousterian character (pl. XLVII, fig. 199). Finally there are a many ordinary scrapers, with a convex or concave edge, retouched at the

end or on the edge of thin flakes. These are usually fairly small or medium-sized tools, but we also find in Smellroren

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the large and coarse scrapers and scrapers that are found at the previous sites. Here too, it is rare that they were shaped on the edge of flat rock plates; most of the time they come from thick convex flakes with sharp edges. In addition to a retouch or a rough knapping, they have often undergone a slight adaptation of the lower face, in order to make the edge sharper and more usable (pl. XLVIII, fig. 201). Fig. 200 (pl. XLVIII) shows a tool of this kind, a heavy double scraper, whose semi-circular scraping parts are the result of retouching carried out respectively on the upper and lower faces of the flake. Fig. 201 shows a wedge-shaped flake, which on its thicker edge (in front of the figure) presents a scraper with stepped retouches and sharpening removals on the lower face. On the thinner edge (bottom right) is another long retouched scraper. The scraping parts are here too obtained by alternating retouches on the upper and lower faces of the flake.

Many instruments must be characterized as real scrapers, obtained on one or both edges of elongated flakes. Sometimes, these are quite thin pieces, with long retouches, sometimes thicker flakes with a lower surface roughly modified or not (pl. XLVIII, fig. 202−204). Some thick double scrapers are cut on flakes that have a longitudinal edge on their lower face. Their cut is therefore rhomboidal. The thickness and special shape of these tools makes them easy to hold while working, despite their small dimensions. This type of instrument is also represented at other sites (see fig. 26 in the text). Figure 205 (pl. XLIX) shows an instrument of this kind, which has also been retouched at both ends, in a way that resembles the core-form scraper or burin-cutter.

All these tools are of modest dimensions. A few are kinds of scrapers with two-sided cutting, obtained by more or less coarse and more or less extensive retouching on both sides. These tools can resemble or be almost identical to a punch (pl. XLIX, fig. 206); but as on the object of fig. 207, it is easy to see that it is not the tip, but the edge that is the useful part.

Finally, remember that scraping or scraping tools are often combined with other instruments, in multiple tools. Thus fig. 208 shows an elongating flake that is retouched on both sides, but which has also suffered burin strokes at both ends, longitudinal and transverse. The tool in fig. 209 (pl. L) is recut on one edge into a very sharp convex and concave edge, and also has scraper retouches at both ends, starting alternately from the upper face and the lower face. Following a large removal, this piece also shows a sort of very crude plane burin (top and right of fig. b). However, one may have wanted to make the scraper more effective. This sort of modification has already been noted with regard to tools that resemble

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"*sinew frayers*", but it is extremely common on scraping tools or scrapers from Smellroren, as in general in the quartzite industry in Finnmark. As multiple tools, we can also cite the burin scraper in fig. 210, knapped from in a thin flake, with retouching of the lower face, and in fig. 211, a flake with a massive heel, which, in addition to a natural cutting edge, has a trench in the middle of the piece, is retouched with scrapers or planes on three different places, two of which have a concave lower face.

Sharp cutting tools.— Four pieces, from very thick flakes, with knapped bifacial sharp edges, have an elongated sub-triangular shape, like a type of pick. The widest end resembles a tranchet (pl. LI, fig. 212). In any case, the tip does not show any noticeable signs of use. These tools could be some sort of strikers. On the other hand, there are picks of similar form in the Upper Paleolithic, in the Danish Campignian, and in the diabase industry of western Norway. Many of the tools have sharp edge formed by the natural edge of a flake. Let us first mention here certain thin flakes of sub-rectangular shape that have a natural edge of this kind at one end, and sometimes also on one edge, while the opposite side and sometimes the base have undergone retouching on both sides, or on the lower side only. This knapping generally removed the bulb of percussion. The cutting edges bear traces of use: they were therefore the useful part of the instrument, even if other parts could also be used as tools for scraping or scraping. These pieces are so numerous and their form is so constant that we find ourselves here, quite obviously, in front of a type. In its pure form, it is identical to Paleolithic cleavers in southern France, Spain and Africa (pl. LI, fig. 213); but there are also pieces of a less certain type, with an almost ovoid outline, where the more methodical cutting of the edges seems to have aimed at being adapted as a scraper (fig. 214).

Closely related to the previous one, a many edged tools have a more pronounced axe shape. They also come from large and thin flakes, but the retouches only take place on one side and perpendicular to the direction of the flake, so that the bulb of percussion was on one of the lateral edges of the axe. These side edges are recut and a cutting edge is made at one of the ends of the piece or to both (original edge of the flake). These sharp edges are most often chipped by use (see, fig. 215, pl. LII, an edge that has undergone

fine retouching). Other similar pieces have only one edge opposite a narrow heel (fig. 216). As can be seen from the figures, these are fairly large instruments. Only one, a double hornstone burin, is of smaller dimension: 0.068 by 0.35m. These are, without a doubt, real axes, made using the tranchet technique. Two of them resemble the double scissors that we spoke about in connection with the other sites, and which come from broken blades or fairly narrow flakes, with opposing edges.

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Among these tools, others are more or less similar to the Campignian "grand tranchet", but are rarely identical. As an exception, the shape can be triangular (fig. 217), but most often rectangular or sub-rectangular, with cutting edges at both ends (fig. 218). The dimensions vary from 0.10m x 0.082m to 0.057m x 0.042m. The edge of these pieces is formed either by a fracture or by a more or less regular cut, which in certain cases can make them usable as scrapers or scrapers (fig. 217, left of fig. a). The cutting edge does not ever need retouching, but as evidenced by a host of small nicks, due to use, it was this edge that above all constituted the useful part of the tool.

Tools formed from thinner and smaller flakes. — It is very difficult, if not impossible, to distinguish the flakes of blades. We must study them as a whole and we will want to remember this during the classification that follows.

Scraper-cutters (?) in the shape of a half-moon. — Let us first mention some fairly large tools whose shape approaches a half-moon. They come from elongated flakes that have a natural sharp edge on one side. This cutting edge can be slightly concave or straight. The opposite edge, the back, is bulged more or less regularly, with a retouch or abrupt blunting, which starts from the tip. Obviously, this part could very well have been used as a scraper, but the many sometimes significant chips on the sharp edge show that it could have been used as a sort of knife. The larger pieces have undergone some removal at the base, or even retouching of the lower face, which suggests a fitting. One of them, large and swollen, with alternating retouches along the dorsal edge and a beak-shaped end (found on others but less pronounced) is shown in fig. 219 (pl. LIII). Others have a shape that approaches a point (fig. 220). Still others, coming from flakes or thin blades, resemble blades with blunt backs (pl. LIV, fig. 222). These are in general fairly large and heavy instruments; but this type is found, although rarely, in a smaller size (pl. LIII, fig. 221), and even in microlithic dimensions (fig. 28c and d in the text).

Points. — Many tools were collected at this site that must be characterized as points of varying shape. With a few exceptions (fig. 224), they come from thin triangular or sub-triangular flakes, and also from flakes that resemble blades or even are true blades. Any precise distinction is difficult to establish. Obviously, the inhabitants of the site knew how to perfectly produce triangular flakes of appropriate shape. We have many beautiful triangular flakes that without the slightest retouch could serve as points for throwing weapons and hunting javelins. But many others, that is to say at least fifty, underwent an intentional modification, very rough in fact in

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most cases, as a result of retouching, crushing or chipping on the edges. It is naturally these intentionally adapted instruments that we show in figures, even if the retouching is not always very visible.

The bulb of percussion is almost always at the base. The plan of strike is plain or faceted. Once or twice it appears to have undergone abrupt retouching on the lower side, while on the upper side lengthwise removals are reminiscent of "sinew frayers" (see fig. 195−196). Only once, a large, fairly thick point, finely cut at the end, is retouched like a scraper, or rather a burin, towards the base (pl. LIV, fig. 224). We undoubtedly have here tools that were not fastened to handles, but held by hand. On the other hand, several pieces seem to have received one or two rough removals at the base, in order to fasten them, for example the somewhat atypical piece in fig. 225 (pl. LV) that has also undergone fine retouching at the tip. It is only very rarely, on the large points that these retouches take the form of a tang (fig. 226). The edges in some are finely retouched over a small area, in a way that resembles scraper retouching. Two pieces show finely retouched notches (pl. LV, fig. 228, fig. 28 b in the text). As an exception, the percussion bulb was found near one of the edges whose thickness then required a more advanced cutting or a bifaced cutting (pl. LV, fig. 226).

As can be judged by the photographs, the shapes are quite variable. Sometimes they are quite large and thick points that seem too strong to be mounted on spears (fig. 224); sometimes the points are longer and lighter, but also thicker, with a fairly prominent dorsal ridge (fig. 223). The most numerous pieces, however, are sub-triangular flakes, thin and wide, and quite light if we consider their dimensions. They must have been very suitable as points for lances or spears (fig. 227, 228).

The site provided a large number of triangular flakes of mediocre or small size, sometimes even real microliths. These pieces have undergone a more or less complete retouch along one edge (pl. LV, figs. 229,

230; pl. LVI, figs. 231−235). In most cases, we are certainly dealing here with points. Many resemble or are even identical to the Abri-Audi type; but some are also similar to blades with retouched or blunted backs.

Since we are dealing with points, let us also mention many elongated blades or flakes with pointed ends and thick triangular cuts. Obviously, these pieces result from a blow applied to the projecting dorsal edge of a block or a cobble. Several could certainly have been used without modification and probably were; others needed a very slight retouch (pl. LVI, fig. 236), or a more complete flake at the tip (pl. LVI, fig. 237). According to their

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Fig. 28. Smellroren. Miscellaneous tools: arrow point with turned back and tang (a); Mousterian-type tip (b); lamellae curved by retouches (c, d). Quartz, red quartzite, flint and red jasper. Natural size.

shape, these points were not piercers, but could very well have been mounted in shock or throwing weapons. What confirms this is that the base still seems to be intentionally modified for fitting, either before or after the knapping of the block. It can be thinned by long removals (fig. 236), or simply improved by a few shorter removals (fig. 237).

Retouched blades. — Many blades were collected, often reaching very large size, in red quartzite; in addition smaller blades and bladelets in dark flint and hornstone. In total, the blades at the site have such an important role that they essentially contribute to characterizing it. Many do not show alterations; yet they were used, as they often show traces of use on the edges. Others have been adapted into real tools. We often see steep retouching. The retouches are of different quality, sometimes fine, sometimes coarser, due to the raw material. Sometimes they just look like fractures or chips. Let us only indicate, by referring to figs. 240 to 246 (pl. LVII), that we find both elongated blades, finely retouched on a more or less long part of the edge, as well as larger pieces, with coarser retouching. In both cases, the retouching can be carried out on the lower side, or, alternatively, on both sides. As an exception, we observe blades with lateral notches (fig. 246) or denticulated blades. Fig. 242

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shows a thick blade of gray quartzite, with a light gray patina; the retouches are after the patina, so that the retouched parts appear dark.

A few medium-sized blades have taken shape, following careful retouching on one edge, the shape of half-moons (pl. LVIII, fig. 247−249). There are so many that this type can hardly be accidental; but we find all kinds of variants: sometimes we get closer to real points, to the points of Abri-Audi or scraper knives that we talked about; sometimes blades with blunt backs (Châtelperron). In total, we see so many transitional forms and variants that it is very difficult to characterize them.

However, let us distinguish many blades and strips – knife-blades – normal blunting along the back (pl. LVIII, fig. 251−255). There are some that resemble or are identical to the Châtelperron blades; many only have one short retouch at the tip, a sort of modification for the finger (fig. 255); others can be difficult to distinguish from the small points that we have spoken of above.

Finally, we will content ourselves with citing a fairly modest number of blades that are retouched into terminal scrapers, most of them convex and more rarely concave (pl. LIX, fig. 256−257).

There are also real piercers, finely shaped on the tip of the blades or of flakes; they are quite long and can reach 0.12m (pl. LVI, fig. 238). There are six of them. A fairly thick flake (pl. LVII, fig. 239) has been cut roughly in the shape of a concave scraper, but it also has retouches on the lower surface.

Burins. — From a first examination of the material from Smellroren, it seems that burins are extremely rare. This comes, in part at least, from the rock used and the crude technique it involves. But a more careful study shows that the number of these pieces is not insignificant. What we find are mainly rather large blades or elongated flakes that have been made into burins on the fracture angle or obliquely to a broad plane of shattering; the burin is sometimes combined with other instruments (pl. XLIX, fig. 208; pl. L, fig. 209). In other cases, core-form pieces, or remains of cores, were used to make crude burins (pl. LX, fig. 264). In both cases, we obtain shapes that can have a true Mousterian appearance. The modification is generally very rough and can, with the rock used, be more or less fortuitous, even if we exclude the pieces that affect the shape of a burin with a fine nose, or a burin on a natural fracture angle that cannot allow certain judgment. The bevel could have been obtained by one or more blows made parallel to the length of the blade, perpendicular or oblique to the fracture plane (pl. LIX, fig. 258, 259), never, it seems, by a blow perpendicular to the plane of the blade. In many cases, the burin cut is replaced by a many small removals, detached obliquely

in relation to the fracture or a thick edge. The result is then a sort of polyhedral burin (pl. LIX, fig. 259, 262); but the shapes are generally very a typical.

Three exactly similar burins, however, constitute a specific type (pl. LIX, fig. 260, 261). They come from large and fairly thin flakes, with polyhedral retouch resulting in a slightly concave lower face, due to a single burin removal. The narrow edge leads us to consider these pieces as burins, despite their certain relationship with careened scrapers. To the group of pointed burins also belongs the tool cited above, in fig. 224 (pl. LIV). We also see a many variants, including double burins and burins-scrapers. Let us draw attention to the tool shown in fig. 263 (pl. LX), from a thick flake, modified on both sides. The thick bevel was obtained by four burin strokes, made alternately on the right and left. The piece should not be confused with the cores or the thick flakes with beaks of fig. 179 (pl. XL).

These are fairly large tools, , as the figures show, that even seem cut more roughly than required by the rough raw material. However, a more careful execution is found in the rare microlithic pieces where better rocks were used. So we find several types of well-known burins, for example the corner burin with a retouched truncation (pl. LX, fig. 265, 266), and sometimes pieces imitating the shape of parrot's beaks (pl. . LX, fig. 267).

Microlithic tools. — For delicate and smaller tools, we have already said that quartz and quartzite were rarely used, but generally black flint and a little hornstone. The meager selection of tools provided by these rocks is clearly microlithic. The cores, numbering half a dozen, are very small and quite irregular, discoid and sometimes elongated. As usual, one or two were cut so far that they took the form of thin flakes, with sharp edges at one or both ends, like hatchets, sharp-edged flakes (pl. LX, fig. 268). Blades and strips are few in number, and those that exist have generally been used for the preparation of tools. These are burins whose length varies from 0.015m to 0.035m (fig. 265−267), various kinds of points, blades with turned backs (pl. LX, fig. 269−271), or small scrapers. There are also, as usual, some small tanged arrowheads (pl. LX, fig. 272). It is appropriate to add a small quartz point with a blunt back and retouched at the base, on the edge side (fig. 28 a in the text). In summary, the microlithic industry is almost negligible when compared to the enormous amount of quartzite material.

Sites of the fjords of the Varanger Peninsula.

Several sites have been discovered in the fjords on the north of the peninsula. Syltefjord offers three that are grouped around Veines, a peninsula on the west bank very close to the end of the fjord. They are called Hamnesodden, Hansemolla, and Kattuglelva. In Båtsfjord there is one site: Ekebergvika. There is also one in Kongsfjord: Strømmen.

32. Hamnesodden.

U. O. Årb., 1930, p. 217, No. 41. C. 24545.

This site was discovered in 1929. It is located on a small peninsula, Hamnesodden, south of Veines, that has a maximum elevation of 27m. The archaeological objects were collected on the surface of the ground. Some digging was done, but gave only meager results. The site is exposed to the south wind, which is particularly violent.

Only eleven pieces were found, all of quartzite, and, except for one, of the red quartzite that is found locally in abundance. Of these eleven pieces, three are blocks or cores, originally cobbles, still retaining significant parts of their original polished surface. The rest consists only of simple fragments, except fora very good blade. Two pieces have slight retouching as a scraper on the edges. Another has a beak or a spur on one side, and on the other side it is retouched as a scraper (pl. LXI, fig. 273). This tool, as well as another little worked flake have been rolled and heavily worn by water.

33. Hansemolla.

U. O. Årb., 1930, p. 218, No. 46. C. 24550, and 1931 32, p. 155, No. 64. C. 24868.

The site was discovered in 1929 and studied the same year and following years. It is located in the northern part of Veines, almost opposite Hamnesodden. It took the name of a place that is used for drying fish that is located at edge of a small bay (see pl. III). The site itself is on a terrace, 300m away from the sea and at 30m elevation (altimetric barometer). The place is sheltered, except against the northeast wind. The soil is made up of a layer of sand covered with thin loam. The objects were collected to a depth 0.20m, especially near a large rock. About 20m^2 was searched.

The raw material used at the site is almost entirely a red-brown quartzite, which resembles or is identical

to that which was found at other sites on the Varanger Peninsula. Nummedal (U. O. Årb., 1931−32, p. 155) points out that this rock can be taken from the ground in the vicinity

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of the site. However, some of the pieces still retain the polished surface of the cobbles: they therefore have this origin. Amongst other rock species used are dark-colored quartz, quartzite, hornstone, and dolomitic flint; but they are each represented by only one or a few samples. The flint in particular provided only two very small cores (length: 0.017m and 0.014m) that are almost reduced to nothing by the removal of extremely thin blades; in addition, a small chip that has sharp edges at both extremities. The site was obviously very poor in good raw materials.

Implements. — The material collected is not very considerable (67 pieces), but it includes a selection of tools of varying shape that are of fairly great interest. The cores are not very numerous. However, we observe a certain number of ordinary discoid blocks, which sometimes produced flakes. As in the others sites, they are thick and the modification they have could make them blunt tools. Sometimes they seem to have received intentional alterations transforming them into scrapers (pl. LXI, fig. 274). The length, common in the workshops of quartzite, is from 0.06m to 0.08m. The piece in fig. 275 (pl. LXI) measuring 0.144m is exceptional; it is an elongate block with a flat lower side and a swollen upper side. It is roughly retouched along the edge on both sides, except at the widest end (at the bottom of the fig.) where there is a faceted striking surface. The flake is reminiscent of retouching using a scraper. This piece is probably a discoid core, unused, although it could very well have served as a scraper or chopper. On the other hand, the tool in fig. 276 (pl. LXII), 0.116m long, is undoubtedly a sort of punch, obtained by the two-sided cutting of a cobble where the polished surfaces still remain in places. As for blade cores, there are none of quartzite, although this rock provided some blades of medium size.

Flakes and blades at this site are medium or quite small. The striking plane is most often single and oblique to the fracture plane. But this is only natural, given the way in which quartzite cores are prepared at the Finnmark sites. Among the flakes, one in particular has a special interest. It is a long flake of 0.09m, quite wide, that has a natural sharpness at the tip and to the far side (left), a well-retouched part. In addition, it has a notch on each of the two edges (pl. LXII, fig. 277).

It is especially the large flakes that provide characteristic tools. As at Smellroren, there are sharp tools where the edge of the flake is used in its natural state, without retouching. A single extended tool has a cutting edge at both ends; the edges are cut perpendicular to the direction of the fracture (see pl. LIII, fig. 218 of Smellroren). The piece is very modified in a very rough manner.

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Likewise we find two cutters similar to those of Smellroren. The one in fig. 278 (pl. LXII) is the largest and most similar to the Campignian tranchet; However, it appears to have scraper retouches on one edge, and on the other edge it appears to have been used, perhaps for scraping (see pl. LII, fig. 217 of Smellroren).

Many flakes were used as scraping or scraping tools. One or two pieces, with a useful protruding or swollen part, could be called planes; others more or less typical scrapers (p. LXIII, fig. 279). But most have scrapers of a more or less fortuitous shape. A single wide blade has an abrupt retouch on its striking surface leading to the lower face, as is also observed at the Smellroren site (see fig. 195, 196). Two others, narrow, with a thick and triangular profile, have also been retouched after splitting, with a simple scraper using the percussion bulb. An exceptional case is that of fig. 280 (p. LXIII); this point-shaped flake, evenly thick and 0.106m long, shows over its entire perimeter more or less abrupt retouches, sometimes with concave parts. At the base is a good scraper whose lower face is partially formed by a large oblique recess.

As at Smellroren, there are many fairly large triangular flakes that could have been used as spear frames. A single large flake (length: 0.087m) has undergone intentional modification on one edge. Finally, let us mention two small flakes: one, of hornstone, is roughly worked, while the other, of red quartzite, is very well retouched along a convex edge (pl. LXIII, fig. 281).

Half a dozen pieces can probably be considered burins, although due to the raw material and size the shapes are crude and not very distinct. Some result from modification at the fracture angle or at the tip of elongated blades or fragments. One or two approach the busque burin. We show two of them that have unusual shape. Figure 282 (pl. LXIII) is that of a large broken flake with a polyhedral burin on the fracture angle. In fig. 283 (pl LXIV), we see a combination of burin and scraper, obtained on a fairly thick flake. One of the ends has a burin resulting from two oblique blows; the other ends are scrapers, one convex and the other concave. This multiple tool has also been rolled quite a bit by water and worn out. This is also the case for another burin from this site.

34. Kattuglelva.

U. O. Årb., 1930, p. 218, No. 44. C. 24548.

This site was discovered in 1929. It is located on a small promontory that juts out into the river, on the south bank, about 500m upstream from its mouth. The height above sea level is 25 to 27 meters.

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At an elevation of about 18m, there is a beach that can be clearly followed around the edge of the promontory (see pl. IV). The antiques were in the sand on the surface. Excavations did not produce satisfactory results.

As raw material, quartz, various quartzites (not the red-brown quartzite of Smellroren and Hansemolla), very little hornstone and some dark dolomitic flint were used.

Implements. — The material collected is not very abundant: 57 pieces in total, and quite small. Some unimportant, irregular blocks or cores seem to have been reused as scrapers and are sometimes reminiscent of careened scrapers. A single piece of hornstone, which now takes the shape of a well-retouched carine scraper (pl. LXIV, fig. 284) is in reality the top of a conical core that provided extremely thin lamellae. It was obtained by a single transverse blow, which left on the lower face an intact shattering plane with a large bulb of percussion. A thin flake of the same rock, with an abruptly retouched circular edge, comes from the sharpening of a bladed core (see fig. 15k). The scrapers are moreover represented by some small and atypical pieces. A large flake, detached from the surface of a cobble, has the shape, perhaps fortuitously, of a non-typical keeled scraper.

Some flakes also have the shape of burins, perhaps by chance. A small blade is blunted on the back near the point, and a small flake has a fine retouch at the end, like a point or rather a piercer. Only four very thick blades that have undergone regular retouching at the tip and on both edges, actually deserve special attention. Two of them are shown here (pl. LXIV, fig. 285, 286). They must undoubtedly belong to a systematic type, although it is unknown in the other sites.

***35. Ekebergvika*.**

U. O. Årb. 1929, p. 177, No. 32. C. 24356.

In Båtsfjord, only one site was discovered. It is located on the east bank of the fjord, very far inland, just opposite a fishing place called Hamna. In a valley there is a farm, Ekebergvika. To the northeast of the buildings, on the side of the mountain, there is a terrace that extends in the direction of the fjord. It is covered with cobbles that have been moved and rolled by the sea (see pl. IV). The artifacts were located at the highest point of the terrace. There, sometimes the ground is covered with a slight bit of earth, sometimes the cobbles are bare. The material was collected at the surface or at a shallow depth. Sometimes they were found under large cobbles. As we will see later, a some pieces were rolled by the waters.

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The level of the site above the sea is 22.46m according to Nummedal (at the place in the photograph where the man is located, pl. IV). The place has a very visible beach, which has an elevation of 19.63m at the outer edge (north) of the site, and an elevation of 17.54m at the inner edge (south). The corresponding figures at Hamna, on the other side of the fjord, are 19.65m and 17.64m. This must be the shoreline of the sea at Tapes.

The site was discovered in 1928. In 1934 a few more pieces were collected there. The total number is 61. With the exception of a single piece of gray quartzite, all come from the well-known red-brown quartzite, which is found in overabundance on this terrace in the form of cobbles. On some pieces, we still see naturally polished parts, remains of their original surface.

Implements. —There are here, as everywhere, some small thick blocks (6 or 7) that must be considered as very used cores. Their shape is more or less irregular. There is no core with elongated blades, which is consistent with the absence of true blades. The cores are more or less discoidal in shape, although there is hardly a single one that can be compared to the Mousterian discs. As usual, the cores are quite small and their dimensions range from 0.04m to 0.085m, much smaller than those of the fragments at this site, one of which measures 0.145m. These large flakes are visibly cut on the surface of cobbles. This means that here, as everywhere in the quartzite industry, the cobble is the true core, either in its natural state, or after a slight modification: the cores that have been preserved are more or less used cobbles, or which have decreased in volume and changed shape as a result of their adaptation into tools. Many are, in fact, also good tools for scraping, planing or striking. Many have undergone intentional and secondary retouching by scrapers or planes, and all have sharp edges, angles or edges that make them usable on several parts, like multiple tools. In fig. 287 (pl. LXIV) is shown an example of one where the edge of the bursting plane is used as a scraper

in two different places.

The flakes, some of which are very large, generally show a plain striking surface, when it is preserved. As shown by the crushed parts of the rim, towards the tip, they were often employed as hand weapons or percussion tools. A large thin flake has been made sharp at one of its ends, like a sort of axe, by bifacial retouching (pl. LXV, fig. 288). The cutting edge seems to have been used. This modification extends to the lower face and has eliminated the bulb of percussion, a feature also common at this site when the flakes are transformed into real tools. Some small flakes, whose striking surface shows facets, are perhaps scrapers.

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Among these cases of intentional modification, tools intended to scratch or to scrape are the most numerous. Several flakes of any shape are adapted into regular scrapers by retouching more or less extensive parts of the edge (pl. LXV, fig. 289). Alone, an elongated flake can be characterized as a concave, pointed scraper. Sometimes the scrapers are combined with other tools on the same piece. Thus fig. 290 (pl. LXV) shows a flake retouched with a scraper; at one of its ends it is shaped like a hatchet or tranchet. Here as elsewhere, in the quartzite industry, the scrapers, especially concave, result from a single oblique removal by a blow given obliquely against the edge of the piece. This technique is observed several times. It is visible on the piece in fig. 291 (pl. LXV), a sort of scraper-scraper, which moreover was cut on both sides around its perimeter. A related example is that of fig. 292 (pl. LXVI, a fairly thick flake roughly retouched at both ends and on one edge. We also find fairly large roughly cut flakes on one side, in the shape of single-sided scrapers (pl. LXVI, fig. 293). It is also a scraper or a saw like the piece in fig. 294 (pl. LXVI), thin flake where the percussion bulb has been removed; and yet this instrument shows similarities to points and to certain punches.

It is difficult to say whether there are real points in the material collected, although some crudely arranged pieces could pass for such (pl. LXVI, fig. 295). It is also not certain that burins are found there. Certain pieces, bearing lengthwise removals − as after a burin blow on the angle of fracture, on the angle of the striking plane, or obliquely on a thick edge − can be the result of chance and do not allow determination with certainty. On the other hand, there are better characterized instruments: the axe in fig. 288, and a sort of double tranchet (pl. LXVII, fig. 296). Like similar objects that come from the sites Prestestua and Smellroren, it is rectangular in shape and it was cut from a huge blade, or rather an extensive flake with sharp edges. It is these edges of the flake (or the blade) that become the cutting edges of the new tool. The modification was made starting from one side only and the piece could serve as a scraper on one edge.

Pieces rolled by water. — Many of the pieces at this site were rolled or worn by water, sometimes even to an extreme degree (11 pieces out of 61, or 18%). All are medium-sized flakes that have preserved their percussion bulb or other certain traces of the work of man. Some seem to have been used as strikers, for example, and show crushed parts on the edge; others appear to have undergone intentional modification, although it is difficult to say for what purpose. One of them however shows on one edge a deep notch that is undoubtedly not fortuitous, and the piece in fig. 297 (pl. LXVII) seems to have undergone retouching on both edges, towards the tip, which makes it a sort of pointed percussion tool.

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36. Strømmen.

U. O. Årb., 1928, p. 98, No. 26. C. 24192.

Kongsfjord contains only one site. It is located on the shore west of a passage called Strømmen (The Current) inside the fjord. It was discovered in 1927. Its elevation is 25m. The Tapes shoreline at the place is at 15m according to Tanner's calculations, and at 18m according to those of Rosendahl. The archaeological objects were found in the sand of the beach and were collected almost all on the surface. Digging did not yield any results.

There are 14 pieces, all in red-brown quartzite sandstone, with the exception of one piece in gray quartzite. They come from cobbles, used for knapping as usual, starting from a flat part of the surface of the cobble, or from a plane fracture, or from one and the other. There are three pieces of this kind, two of which, quite large and thick, have been roughly converted into scrapers. The third has been adapted in a way reminiscent of the burin cut on the angle of the striking surface. The rest consists of medium or small ones that sometimes show slight traces of use.

Sites located in the vicinity of Berlevåg.

There are five of them, all discovered and explored by Nummedal and Rosendahl in 1927.

37. Storelva.

U. O. Årb., 1928, p. 95, No. 21. C. 24187.

This site is located a short distance south of Berlevåg, on the north bank of Storelva (The Big River), where it meets the Veddal River. The place is covered with a thin layer of dirt. The artifacts were found in the sand below this layer at a depth of 0.15m to 0.20m. A total of 15m² was explored. Elevation of the site: about 20m.

The raw material used for the important tools is red-brown quartzite (a total of 15 pieces). In addition, a fairly large number of small pieces of dolomitic flint, a quartz core and a flake of dark gray quartzite were collected. The red-brown quartzite certainly came from cobbles.

Implements. — Among the pieces from the site, there is not a single good core. Only one semi-cylindrical block, of quartzite, shows traces of knapping from ordinary blades; it may have undergone secondary core-scraper modification at both ends. However, no real blades were found. Furthermore, a

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piece of cobble gave flakes on two intersecting faces, one of which was retouched in the shape of a very crude scraper.

There are a dozen pieces of flaked flint, some of which have retained the character of flat and thin cores. However, most are chips that have undergone knapping, some before, others after the piece was detached from the block. An oval quartzite cobble that served as a striker has crushed parts at both ends. It weighs 307 gr.

Among the tools intentionally adapted, let us first mention a piece that retained the polish of the original cobble on one side, with the exception of some removals at one of the ends. The opposite side has undergone retouching, as if one wanted to obtain a punch; but if this is the case, the tip is not finished. The piece resembles that in fig. 276 (pl. LXII), by Hansemolla. Its length is 0.17m.

With these exceptions, all the tools at the site come from flakes. Let us first point out two tranchets of rather typical shape. The most characteristic is shown in fig. 298 (pl. LXVII). The other is almost rectangular and measures 0.06m by 0.055m, and has a cutting edge at both ends, as we have already noted at other sites. Both instruments have undergone good modification, but only on one of the edges, while the other is formed by one or more fractures. The edges have small chips from use. To the same group belongs the piece in fig. 299 (pl. LXVIII), the widest end of which is formed from the natural edge of the flake, and used, while the sides are retouched into convex and concave scrapers.

As almost everywhere in Finnmark, scraping or scraping tools are numerous. Here too, they were shaped either on the upper face, or on the plane of shattering, or on the plane of striking flakes of accidental shape; they are sometimes combined with other instruments. When the rock is quartzite, the size, as always, is coarse. Finer rocks give better shapes. So the site provided a small, good quality muzzle scraper, made of black flint.

Finally, let us mention some pieces made into angular burins or burins by the fracture of thick flakes. It is sometimes due to pure chance; but two pieces appear to result from intentional retouching. Fig. 300 (pl. LXVIII) shows one that has undergone two removals by burin at the top of the flake, not to mention a scraper modification, very crude and rough, on part of the edge. The piece in fig. 301 (pl. LXVIII) shows at the top and left a long and coarse polyhedral burin. The right part of the piece is shaped into a sort of axe edge.

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38. Barakken

U. O. Årb., 1928, p. 96, No. 22. C. 24188.

The site with this name is located near a barracks just below a rock quarry used for the works of the harbor of Berlevåg. The antiquities were collected on the surface. Excavations yielded almost nothing. The ground is made up of an old beach covered with cobbles. Elevation: about 18m.

The material is not considerable. It consists mainly of red quartzite (17 pieces), quartz (17 pieces), a little grayish quartzite, as well as hornstone and dark dolomitic flint; finally two pieces of rock crystal. In addition, a quartzite cobble (210 grams) served as a striker.

Good quality blades are missing. We are dealing here with an industry of small flakes. No core is really good, but some blocks have produced flakes; the corner of a red quartzite cobble, following knapping and perhaps modification, took the form of a percussion instrument − a sort of chopper −, with a semi-circular cutting edge and a thick heel. Let us also mention an irregular core of hornstone and another, very small, of

rock crystal (length: 0.015m) that provided extremely small flakes. Some flint and hornstone pieces have flaked edges.

Among the limited selection of tools, the most common are scrapers, made either on thick blocks of quartz, in a manner reminiscent of core-form scrapers, or on flakes of quartz, quartzite or hornstone, with very rough retouching done partly on the fracture plane. Two sub-triangular flakes of red quartzite are roughly arranged on two edges into atypical double scrapers. A triangular quartz flake appears to have been retouched into a muzzle scraper.

A quartzite flake, 0.04m long, has undergone a rough retouch on one edge, resulting in a fairly pronounced denticulation. A quartz flake, 0.062m long, is retouched on both sides, and forms at one end a sort of two-sided striker. Moreover, the only certain tools are a good little flint point, similar to those from Abri-Audi, and a small fine drill of the same rock, fitted to the point with a thin flake. Real burins are not represented, although some quartz flakes more or less resemble their shape.

39. Vest for Berlevåg.

U. O. Årb., 1928, p. 93, No. 19. C. 24185 and A. Nummedal: Stone Age Finds, p. 92.

This site is located just west of Berlevåg, above the Tapes shoreline, at an elevation of about 20m. The ground is formed by a bed of sand covered in places with a slight touch of earth. Archaeological objects were

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Fig. 29. Berlevåg. Double (?) burin on hornstone flake. The points on the right and at the top are obtained by two transverse burin strokes and lateral retouching. Natural size.

partly found on the surface and partly discovered following some excavations, carried out to a depth of 0.15m.

The material used is red quartzite (10 pieces), and hornstone. There are also some pieces of dolomitic flint, quartz and lighter quartzite. All these pieces come from cobbles and the knapping is as we know. This is how a large block of red quartzite (dimensions 0.18m x 0.14m x 0.12m) was detached from a cobble following a large fracture plane that served on one of its edges as a striking plane and as a starting point for various bursts. Another important piece (dimensions: 0.12m x 0.11m x 0.06m) was undoubtedly also originally a core that took the shape of a sort of chopper, with a thin sharp edge and a thick heel (pl. LXVIII, fig. 302). It remains to mention only two bladed cores, one of flint (length: 0.032m) and the other of hornstone (length: 0.03m) that was undoubtedly reused as a core-form scraper at both ends; finally, a small thin flake coming from the sharpening of a hornstone core (as at the top of fig. 15k).

The red quartzite provided, as usual, some large flakes. Some, as the chips at the tip show, were used as strikers, without the slightest modification; another oval flake (0.094m by 0.036m) was shaped on the edge into a thin bifacial tool.

Implements — Let us first mention three slicers, one of which, of hornstone, is very typical (see Stone Age Finds, fig. 230). The other two are smaller (dimensions: 0.052m x 0.056m and 0.056m x 0.046m) and have been modified more crudely; their shape is sub-rectangular and they have cutting edges at both ends, like the corresponding tools of other sites. Another flake of red quartzite is roughly made into a narrow and thick corner burin, resembling in shape and size certain busque burins from Smellroren; it could also have been used as a scraper or burin at the other end (pl.LXIX, fig. 303). A flake, 0.115m long, roughly retouched on the

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Fig. 30. Microlithic tools: bladelets with blunted backs (a−b); tanged (d) and notched (g) arrowheads: fortuitous burin?) (e); bladelets retouched with a narrow burin at the top ("taraud") (f). Nos. a−f, of hornstone, come from Berlevåg; No. g, of flint, from Skjånes. Natural size.

fracture side, shows a sharp cleaver on one edge; in addition, at the tip it takes the shape of an enormous burin, resulting from rough removals on the fracture angle (pl. LXIX, fig. 304). A quadrangular hornstone flake has received two burin cuts on one corner and lateral retouches in the shape of a notch, which make it a sort of spur or perhaps a burin (fig. 29 in the text). A smaller flake of the same shape and the same rock has undergone a lateral removal on a thick edge, which could have made it usable as a burin.

There are no really good blades, with the exception of a very beautiful piece with a turned back (pl. LXIX, fig. 305) that bears a sort of tang following longitudinal removals, of which the last was due to a burin

blow. Among the hornstone waste, one can, if necessary, distinguish a few flakes or short blades of poor quality. Some have been retouched into microlithic tools; we thus have: one or two small scrapers, two blades with turned backs, a very ordinary tanged arrowhead, two small retouched points and a small flake made into a burin. In addition: a small blade retouched obliquely at both ends and a short blade that has retouches on the back near the tip, a narrow and oblique burin ("tap"), and a notch on the opposite edge; it is quite similar, in its shape, to the large quartz instrument of Steinseng, which we will see later (see pl. II, fig. 470). A selection of these parts is shown in fig. 30a−f in the text. Finally, let us recall that there are a few chipped pieces.

40. Zoar.

U. O. Årb., 1928, p. 94, No. 20. C. 24186 and A. Nummedal: Stone Age Finds, p. 92.

The site is located west of Berlevåg, about halfway between Berlevåg and Skonsvik, on the southwest slope of a mountain ridge. Nearby there is a house, Zoar, that gave its name to the site. The research

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covers an area of about 20m² and provides quite considerable material, in total 81 pieces. The place is an old beach and the objects were collected up to a depth of 0.30m. Elevation: about 20m.

Almost all the pieces are red quartzite; some in light or gray quartzite; just one of quartz. It was cobbles that were used.

Implements. − Two oval cobbles showing crushed parts around their perimeter, as usual, served as strikers. In addition, both show some sort of shallow depressions on their two opposite flat faces, made by percussion, undoubtedly with a view to fitting. The weight of the pieces: 1060 and 315 grams. In addition, a piece of cobble that probably served as a core, took on a globular shape. On one edge, it more shows the traces of impact against the anvil during the knapping, than to its use as a striker.

Half a dozen blocks were used as cores. Only one, elongated in shape, shows traces of blade cutting or long flakes, which is consistent with the rarity of blades at this site. The other cores are discoid, rounded or irregular. Most have an intentionally designed striking surface, plain or faceted, but in general the knapping was carried out in several places. These pieces are mostly very small; one of them measures only 0.038m. Only one, at 0.102m, was little used, with a plain striking surface and another with facets. As usual, several cores were used as scrapers, with or without modification; one or two resemble two-sided tools after retouching.

For the rest, the material consists of waste, then knapped flakes and tools derived from these flakes, all of medium or very small dimensions. Only a few pieces reach 0.10m, and the longest, 0.105m.

Let us first mention around ten cutting tools, shaped on large flakes with a naturally sharp edge. They are generally small and their length varies from 0.055m to 0.072m. The percussion bulb has disappeared, except on the sample in fig. 306 (pl. LXIX). On two pieces, the cutting edge was retouched from the fracture plane; another, cut on both sides, has undergone removals parallel to the cutting edge, particularly on the lower side. We can with certainty characterize most of these tools as Campignian-type tranchets; the chips on the cutting edge show that it constituted the useful part of the instrument. However, on several pieces, the edges are cut so that they can be used as scrapers.

As usual, there are very many scraping and scraping tools. The shapes are varied: fairly large or medium scrapers, coming from various flakes after summary retouching; small and thick scrapers, sometimes with retouching on the underside of the flake; scrapers of the type of keel-scrapers (two); pieces similar to muzzle scrapers (two), etc. A thick flake, 0.053m long, deserves particular attention: it is retouched at both ends with a thick scraper or careen, while

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on one side, due undoubtedly to sharpening, it has an abrupt scraper retouch, forming an angle with a hollow removal on the other face. This piece looks exactly like the one in fig. 54 (pl. XVIII), but due to the rock − a red quartzite − the flake is coarser. A sort of careen scraper or plane is shown in fig. 234 of Stone Age Finds.

Some fairly large pieces must be characterized as scrapers, resulting in part from retouching of the lower face. One of them is one of those double scrapers, thick, with cutting edge on both edges, which we have already noted at Smellroren and at other sites (pl. XLIX, fig. 205 and fig. 26 in the text). A triangular flake 0.08m long was fitted on one side, in an atypical manner, in a scraper or point (pl. LXIX, fig. 307). A thin trapezoidal flake has retouches or fine chips on the longest of its parallel edges, which give it the appearance of a saw. (Pl. LXX, fig. 308).

There are multiple tools, although rare. One of them, reproduced in fig. 235 of Stone Age Finds, was made on one edge into a scraping or cutting instrument and had on the opposite edge a spur between two crude notches. Similar tools are found at Smellroren and other sites. Fig. 309 (pl. LXX) shows a tool of the same type: it is a thick triangular flake that has been slightly adapted into a scraper at the tip, while the at base the striking surface is provided with a sort of burin limited by two gouge cuts on the lower face, with corresponding modification of the upper face. A related piece is that of fig. 310 (pl. LXX), which is retouched like a scraper at its widest end, with removal of sharpening on the lower face (fig. b); the opposite end has a sharp angle on the lower face, produced by a sort of burin cut. This tool looks surprisingly like that in fig. 209 (pl. L) at Smellroren. We can also see on the lower side several gouge cuts resulting from a single removal. This way of providing cutting or scraping edges is also quite common at this site.

Finally, let us point out a few pieces that more or less resemble burins, but which are quite difficult to characterize, due to the rock and a rough modification. Only three pieces, which seem to have received fine intentional retouching alongside removal with a burin, allow us to be more certain. They should be seen, respectively as: a corner burin with a retouched truncation, a double burin of the same type, and a sort of busque burin.

41. Skonsvika.

U. O. Årb., 1928, p. 97, No. 22. C. 24189 and A. NUMMEDAL: Stone Age Find s, p. 94.

This site is located north of the Skonsvika farm, about 6 km west of Berlevåg, at an elevation of about 20m. The ground is covered with large cobbles, and knapped stones were found either between the cobbles or at a depth

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of up to 0.50m under rocks that were sometimes so large that it was difficult to turn them over, says Nummedal.

Eighteen pieces were collected, one of which is made of quartz and the rest knapped from the red quartzite that is found everywhere. Five blocks must be considered as irregularly shaped cores, following very extensive knapping. Some appear to have been reused as scraping or scraping tools. Only an elongated block is cut on the edges into a two-sided scraper, similar to those of Smellroren and other sites (see pl. XLIX, fig. 206).

Among the flakes, some, here too, were used without retouching. Several scraping or cutting tools were obtained by retouching, either on the edge of a thin flake, or at the tip of a laminar flake. A circular flake (diameter: 0.064) has two semi-circular scrapers, obtained by retouching starting, for one of the two, from the upper face, and, for the other, from the lower face of the flake (see Smellroren, pl. XLVRI, fig. 200).

There are only three blades. One of them is thick and has the shape of a burin at the tip.

Sites located on the Nordkyn peninsula and at Laksefjord.

At Tanafjord, we have not yet succeeded in discovering a site, despite the search carried out mainly in the interior of the fjord. On the other hand, three sites were found on the Nordkyn peninsula, in the vicinity of Gamvik, beyond 71º north latitude. These are Brattbakken and Elvevåg I and II.

At Laksefjord, only one site is known, on the point called Skjånes, south of the Lebesby church.

42. Brattbakken.

U. O. Årb., 1928, p. 101, No. 32. C. 24198.

Discovered in 1927, this site is located on an old shoreline, a little south of Gamvik. There are two shorelines, one at 10 meters and the other at 20 meters above sea level, which represent respectively the Tapes shoreline and the late glacial shoreline. The site is located between the two shorelines and equidistant from each of them. The pieces were collected on the surface in several places from where wind had blown away the dirt. Some diggings were also made.

The material, quite modest, is red quartzite (32 pieces) and white quartz (29 pieces). It also includes some samples of various quartzites. Everything comes from cobbles.

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Implements. − A quartzite cobble shows crushed parts at both ends, as usual. Although it is quite large compared to similar pieces from other sites (it weighs 1.750 kg), the traces of use that it bears suggest that we are dealing with a striker and not an anvil. It is a large core with removals all around its perimeter, the flat

lower face having served as a striking surface. The size gives it un some ways the appearance of a heavy scraper, as we have already reported from other sites, made on similar plates or on pieces of rock. The diameter of the piece is 0.117, its thickness is 0.093m. A narrow flake, 0.107m long, coming from the surface of a cobble, has undergone knapping on both edges, which has given it the shape of a sort of punch, accidentally, no doubt. On the other hand, a fairly large number of quartzite and quartz cores provided flakes. Their dimensions are small − the largest is 0.064m in length − and their shape is irregular, because most of them have been much used. As usual, several pieces seem to have undergone secondary modification or were used as scrapers.

We did not find real blades, but several medium-sized flakes; these sometimes seem to have been used without modification. There are also tools made from flakes. Here too, scraping or scraping instruments are in the majority. In addition to a fairly large number of scrapers coming from any flakes of quartz or quartzite, roughly cut, it is necessary to mention two typical scrapers (of quartzite) that have nearly the shape of a half-moon, with a very projecting cutting edge; then a thin plate of gray quartzite, with one concave longitudinal edge coarsely retouched. It is also a sort of scraper made of a flake of gray quartzite, shaped like a beak and very roughly cut.

There are four sharp or cutting tools; these are cutters or a kind of atypical sharp edges, which utilize, like cutters, the naturally sharp edge of the flake. They are small and their length ranges from 0.054m to 0.073m. One of them certainly − and perhaps several − is retouched with a scraper all around, except on the edge. Two are shown in figs. 311 and 312 (pl. LXXI).

Two small triangular quartzite chips are retouched on one edge into small points with a convex back, reminiscent of those from Abri-Audi. Finally, let us mention many flakes that resemble burins of various shapes. Only one or two that have transverse retouches can be considered certain.

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43. Elvevåg I and II.

U. O. Årb., 1928, p. 102, No. 33. C. 24199.
II. Ibid. No. 34. C. 24200.

The Elvevåg site is located on a terrace at the end and on the northern shore of a bay called Elvevåg, a little north of Gamvik, on the road to the Sletnes lighthouse and between two shorelines, whose elevations are 10 and 20 meters. It was discovered in 1927. The knapped stones were collected on the surface or from a few diggings.

The pieces number 72 and are mainly composed of flakes of quartz and red-brown and gray quartzite, which undoubtedly come from cobbles found at the site or in the area. A single small flake of red quartzite is a little rolled or worn by water.

Among these objects, let us first mention the remains of an elongated core, of gray-brown quartzite; it was used for knapping long flakes, by blows made on a flat striking surface, puffs of short flakes by blows made to the right and left along a sinuous edge. There is also a very small discoid core in red quartzite (0.036m by 0.017m); another, smaller, made of quartz, and a small cobble; all three bear traces of knapping, and secondary knapping transformed them into thick scrapers.

There are only a few blades, all of poor quality and without modification. On the other hand, there are real tools made from flakes. Let us first mention a thick flake, quite large (0.086m by 0.04m), hemispherical in shape; it is cut into a very coarse scraper over a large part of the circumference; in addition a few flakes of any shape, shaped into scrapers, sometimes with retouching on the fracture plane.

Two oval flakes of gray quartzite are cut on both sides and have a burin at the tip that is undoubtedly not accidental. Likewise there is a definite burin on the end of a blade, made by two associated burin strokes, on the edge of an obliquely retouched truncation. Many flakes, more or less similar to burins, are probably not real tools.

Finally, we must mention two triangular flakes of quartz and quartzite that were roughly and incompletely shaped into small points of the Mousterian type. Both measure 0.049m.

The Elvevåg II site is located south of Elvevåg between the two mentioned terraces, whose elevations are 10 to 20 meters. It was discovered in 1927. The knapped stones were almost all collected on the surface.

They are few in number and it seems that only red quartzite (13 pieces) and quartz (14 pieces) were used here. The quartz provided four blocks resembling

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cores that sometimes take the form of thick scrapers; in addition two blades of poor quality and some flakes, one or two of which appear to have been adapted into scrapers. The quartzite pieces are only small flakes; some are roughly retouched into scrapers and two can pass for atypical burins.

44. Skjånes.

U. O. Årb., 1933−34, p. 83. C. 25469.

Only one site could be discovered along Laksefjord. It is located very close to the Skjånes lighthouse, a little south of Lebesby, about 30m above sea level (altimetric barometer) (see pl. V). According to Dr. Tanner, the late glacial shoreline has an elevation of 43 to 45 meters and the Tapes shoreline has an elevation of 17 to 18 meters. The antiquities were found in the sand and were collected from the surface, most of them in a small area, and the rest from beyond that, in the surrounding area. Digging yielded almost nothing.

We have a total of 64 pieces, many of which are waste. The rock used is mainly a gray quartzite or quartzitic sandstone. We also find a little quartz, a sample of a dark siliceous stone and only two pieces of the red-brown quartzite so common in eastern sites.

Implements. − Only two small blocks can be considered as irregularly shaped cores. They are quite small (length: 0.046, and 0.065m) and their size does not correspond to that of the blades and flakes of the site, although the latter pieces are only of average size.

We are dealing here with a well-characterized, although fairly mediocre, flake industry. We observe both elongated knapped flakes without special modification, and tools shaped on flakes. As usual, certain small triangular flakes seem to have been cut to serve as points (of a spear, for example) without retouching. Sometimes they underwent rough modification (pl. LXXI, fig. 313.) On the other hand, three flakes are very well cut into scrapers. The longest measures 0.075m. Fig. 314 (pl. LXXI) shows another scraper that has a convex cutting edge on one of its edges, and which, in addition, has suffered a large removal on the lower face due to a blow struck obliquely on the opposite edge. The result was a sharp edge that could be used to cut or scrape, without additional retouching. The size of the lower face, the removal of the bulb of percussion and, partially, of the striking surface can also be seen on several flakes; one or two, almost circular, are of uncertain purpose.

Fig. 315 (pl. LXXII) shows a fairly large sub-triangular flake with a thin point, which on one side is cut in the shape of a punch. The thicker heel is modified on the lower face and at the striking surface, in a very heavy scraper. There are also quite a few scrapers. Five small fragments of various shapes

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and a small blade have some retouching on the striking surface. An elongated flake (or a large blade) with a thick triangular section, is retouched at both ends into a convex and concave scraper, with slight modification of the lower face at both ends (pl. LXXII, fig. 316).

Certain pieces have roughly the shape of a burin and one of them is certainly one: because we see the coexistence of an oblique retouch and a fracture or removal by a burin (pl. LXXII, fig. 317).

Really good blades or slats are missing. There is only one microlith: an arrowhead with dorsal retouches and a tang that forms a sort of notch (fig. 30 g).

Sites located on the island Magerøya and near the Magerøya Strait.

In the area called Magerøya, where the North Cape is located, two sites are recognized: Skarsvåg and Valan. South of the Magerøy Strait, which separates the island from the mainland, Lafjord begins, pointing almost exactly towards the south. Also there two sites were discovered: Laholmen and Lafjordstua.

45. Skarsvåg.

U. O. Årb., 1931−32, P. 150, No. 44. C. 24848.

The place called Skarsvåg is located at the end of Risfjord, in the northern part of Magerøya, southeast of the North Cape. The land rises gently from the sea along the stream that comes from Lake Storevatn. On the west bank of the stream, just south of the school house along a path, Nummedal found traces of a site in 1930. The place is sheltered, except from the east wind. Immediately below extends a terrace, at an elevation of about 10m.

A total of 110 pieces were collected, of quartz, quartzite, hornstone and rock crystal. Of this number, only six underwent modification; the rest is small-sized waste.

There is no real core, with the exception of a globular piece of quartz, which seems to have been retouched to a scraper in two different places. A piece of elongated, core-form quartzite also seems to have been remade to a scraper following longitudinal removals from the upper face, and transverse removals from the lower face. The other tools are also scrapers; two small ones, in rock crystal, have been roughly retouched.

Only one fairly large flake, of gray-green quartzite, deserves special attention. On the upper face, near the striking surface, it has undoubtedly been formed as a scraper (convex), at a place where the piece is now very thin. The opposite end, which is very thick, is retouched on one edge into a scraper, and on the other, knapped into the shape of a burin (pl. LXXII, fig. 318).

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46. Valan.

U. O. Årb., 1931−32, p. 156, No. 68. C. 24872.

Just north of Honningvåg, in the southern part of Magerøya, Selvågklubben is a point of land that extends into Kamøyfjord, almost exactly towards the north. At the very south of this point, between the Valan and Falkebergbukt farms, the land lowers, and if the sea rose by 5 to 6 meters, Selvågklubben would be an island. The site discovered in 1930 is located in the center of this promontory, on the southern slope. It is sheltered on the northern side, but quite exposed in other directions, and especially to the southern wind, which can be violent. The ground is gray-brown sand mixed with cobbles, partly covered with a thin touch of brier soil. Just below extends a terrace that forms a curve from east to west (see pl. V). To the east, the leveling is established at 11.70m, to the west at 11.37m above sea level. One of the archaeological pieces was collected on the terrace, the others higher up, especially at an elevation of 13 to 15 meters.

Only a few pieces come from various dark quartzites; three small flakes are made of rock crystal and two were knapped from a dark stone that resembles flint. The rest is a sort of gray-green quartzite, or rather diabase. For the knapping, cobbles found on the same site or nearby were used.

Implements. — The material from this site is not considerable (51 pieces in all), but it has a very massive and archaic character, perhaps due to the nature of the rocks used. There is no core of regular shape. However, there are a few cobbles, some parts of which have provided chips; one of them has certainly been used as a true core (pl. LXXIII, fig. 319). It's a very interesting piece, that illustrates just the way what we noted previously about the knapping of blades and flakes on the core cobbles of Smellroren and other sites. We refer to the chapter devoted to the technique (p. 145).

Cobbles of various rocks and varied dimensions were also used to shape many tools. A very large sub-triangular plate (dimensions: 0.217m x0.205m x 0.069m), of a gray rock of poor quality is cut abruptly at the base and more obliquely at the tip, shaped like a beak or snout, limited by concave parts (pl. LXXIV, fig. 320). It is difficult to say whether this shape is the accidental result of knapping, or whether the piece is indeed a huge tool; the last supposition is however the most probable. The piece is a little altered and worn by water.

Several cobbles have been adapted by a rough cutting into blunt tools. We show in fig. 321 (pl. LXXIV) an elongated and thick cobble, made of dark quartzite,

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very roughly cut in the shape of a punch or striker. The piece in fig. 322 (pl. LXXV), probably of diabase, more carefully cut, is of the same type, although the point is quite coarse. This is again the case of a thick, sub-triangular flake, cut on the surface of a block of quartzite, but very roughly modified at the point. Finally, let us point out in fig. 323 (pl. LXXV), a thick triangular plate of diabase, roughly adapted into a striker by a two-sided knapping of the point, while the opposite side has undergone crude retouching and appears as an enormous thick scraper, of which we have found examples at previous sites.

Several of the collected fragments are quite large (the largest is 0.19m long). The striking surface is plain or has coarse facets, which does not have much significance, according to what we have observed of the knapping. We see in fig. 324 (pl XXVI) a splinter that was not modified, but which served as an instrument of shock, judging by the crushed parts of the point or near the point. Likewise, we have many tools shaped from more or less large flakes. As always, these are, for the most part, scraping or scraping tools. Thus, a large triangular flake has been cut on a scraper edge, while the lower face is slightly trimmed (pl. LXXVI, fig. 225). Smaller flakes provided some crudely retouched scrapings on one edge; this is also the case with one or two thick scrapers, or planes, one of which resembles the top of a conical core.

A single thin cutter, from a sharp-edged flake, appears to have been intentionally made. A piece of flake resembles the shape of the double tranchets that we found at other sites (pl. VII, fig. 3 etc.; pl. LXXVII, fig. 326). Finally, two pieces have, perhaps fortuitously, the shape of burins. There are no cut points, but certain unretouched triangular flakes could have been used as spear points.

The quartzite and diabase of Valan are poorly suited to making good blades, and in fact none are found. On the other hand, we have a fragment of a hornstone blade extremely worn on the edges, probably because it was used, or because it has undergone irregular retouching.

Many of the pieces of Valan have been rolled or damaged by water. This is the case, to a variable degree, for tools of primitive form, as we see in figures 320 to 323, more so on the large flake of fig. 324, and especially in fig. 327 (pl. LXXVII) which shows a hard quartzite slab, roughly cut on a convex, scraper-shaped edge.

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47. Laholmen.

U. O. Årb., 1931−32, p. 150, No. 44. C. 24849.

This site, discovered in 1930, is located on a promontory, Halsen, whose end forms a small hill, just south of Laholmen, on the east side of the fjord. The elevation is 23 meters. The knapped stones were in the sand from the beach and were collected at the surface. There are 38 of them, and they consist mainly of waste; the raw material is sometimes a dark siliceous rock, sometimes quartzite, especially a dark gray quartzite of good quality. One piece is real chalk flint.

Among the knapped pieces, two core-form blocks have, perhaps fortuitously, the appearance of thick burins. Another small, extremely used core from the same excellent dark rock has a sharp edge on one side. The top of a conical core was probably used as a scraper. Blades are rare; one or two have been retouched into scrapers; another has, no doubt fortuitously, the shape of a burin. A large circular flake, knapped on the surface of a dark quartzite cobble, is formed on the fracture plane into a sort of semi-circular scraping tool. On this flake the striking plane and the percussion bulb were removed.

48. Lafjordstua.

U. O. Årb., 1931−32, p. 151, No. 46. C. 24850.

At the end of the fjord is a telegraph hut called Lafjordstua. Nearby, on the west bank of the river, a site was discovered in 1930. Elevation: 19 meters. The ground is made of bare sand, mixed with small cobbles. The objects were collected on the surface. Digging yielded almost nothing. As raw material a black siliceous rock (150 pieces, mostly waste) was used, as well as some rock crystal and quartzite, but mainly a milky white quartzite of good quality that provided excellent blades.

Implements. — A dozen core-form pieces were found. They are generally small and do not exceed 0.06m in length; they underwent varied knapping that gave irregular shapes. Most are more or less discoid. without being real discs. One piece is sub-rectangular and provided fairly small blades; another, very small, made of rock crystal, is almost reduced to nothing by the knapping of fine strips all around its perimeter; one or two have suffered so much removal that their sharp edges are chipped. Two discoid cores seem, as usual, to have received a secondary modification as scraping tools, and almost all have sharp edges that allow scraping or chopping. A

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Fig. 31. Microlithic tools: arrowheads with tangs and turned backs (a−c) from Lafjordstua; bladelet with backing and retouching of the lower face (d), from Vedbotneidet; backed bladelet and tanged tip (e−f), from Kolvik. Quartzite and flint. Natural size.

cut flake has a beak on one edge, as we have noted elsewhere (pl. LXXVII, fig. 328).

The Lafjordstua find reveals a rather characteristic blade civilization. Large flakes are absent and there are hardly any tools formed on flakes. The only undoubted one is that of fig. 329 (pl. LXXVII), but this piece is an almost typical old disc, transformed into a sort of thin puck by very extensive use. On one edge (on the left in fig. b), we observe facets that probably come from the preparation of the block. On the opposite side, this part of the piece is chipped, undoubtedly due to knapping (fig. a). This same piece also has a very sharp part in the shape of a burin with a notch (at the top of the fig.).

On the other hand, we find some blades and tools shaped on blades. As at similar sites, there are a large number of fairly ordinary scrapers, resulting from retouching at the tip or base of the blade. These retouches are sometimes carried out on the lower face (pl. LXXVII, fig. 330). A wide blade has a deep notch. Two blades are retouched on one edge in a way reminiscent of the Châtelperron type; another, irregular, is cut to a burin.

Finally, let us mention that a fairly large blade is recut into the point of a tanged arrow (?), with alternating retouches on the two edges (pl. LXXVII, fig. 331) and that there are three ordinary microlithic points, (fig. 31 a−c).

Porsanger Sites.

Along Porsangerfjord sites have been discovered in several places. Two are located towards the mouth at Repvåg on the west bank of the fjord (Repvågeidet and Vedbotneidet); three others very far inside the fjord near Kolvik (Kolvik, Russedalen, and Storbukta), across from another site,

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at Børselvneset. Finally, further still, a site is located on the point called Steinneset that juts out into the fjord. However, we did not succeed in finding any sites at the very end of the fjord or along the river that flows into it. The Porsanger sites are numbered from 49 to 55 on the general map.

49. Repvågeidet.

U. O. Årb., 1928, p. 59, No. 7. C. 24173 and A. NUMMEDAL: Stone Age Finds, p. 38.

At Repvåg, a peninsula juts out into the fjord. The northern part of the isthmus has two bays, Repvåg and Vedbotn. Starting from both, fairly narrow and low-elevation passes lead to Indrebukta, on the southern slope of the peninsula (see the map in: Stone Age Finds p. 38).

At Repvågeidet, in the interior of the most remote bay of the land, Nummedal found traces of a site in 1926. The archaeological objects were mostly found on the surface, on the bare ground of the terraces; excavations yielded few results. The site is well sheltered, except against the south wind. Its current elevation is 20 to 26 meters, the Tapes shoreline is 14.50m, and the late glacial shoreline is 35.45m (Marthinussen's leveling). See a view of the site on p. 40 in Stone Age Finds.

All together, 70 pieces were found; among this number there is a lot of waste and an ordinary hammerstone, an oval cobble, the ends of which are crushed (weight: 455 grams). The rocks used were dark and light flint, a little quartz and various quartzites, one of which in particular, is dark gray. Cobbles were often used, because parts of the original polished surface remain on the pieces. This is what we see in particular on two fairly large cores of dark quartzite, ancient cobbles that took their present shape due to various knappings. One of them, an almost typical disk, with a prepared striking surface, is shown in Stone Age Finds (fig. 86). The other is elongated and has undergone knapping of flakes, starting either from the flat faces of the piece or from a striking plane resulting from an oblique removal at the end, which thus takes the form of a chopper. In terms of cores, we also find two small discoid pieces (see Stone Age Finds, fig. 87), which are perhaps scraping tools, and two others, quite large, elongated, of irregular shape.

This site does not contain really good blades. The tools have the character of a flake industry. Two of them could be characterized as typical Levallois flakes. The best measures 0.115m and was retouched before knapping on its thick edge and on half of its striking surface; in addition it has a pointed end, which is undoubtedly due to intentional retouching. Two fairly large flakes were adapted into tools, by retouching not only on the upper face but also on the lower face, which completely removed

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the striking plane and the percussion bulb. This flake sometimes resulted in sharp edges and notches without retouching, sometimes in certain places, rough scrapers or scrapers, sometimes with modification of the opposite face (pl. LXXVIII, fig. 332).

Here too, scraping or scratching tools are in the majority. Let us cite an oval plate of thick and long quartz, measuring 0.071 in length, made into a double scraper by alternating retouches on the two edges; then a fairly large number of flakes of medium size and of any shape that were locally shaped into more or less rough scrapers. In one case, the retouch was made at the base of a triangular flake, very close to the bulb of percussion (see Stone Age Finds, fig. 88).

Three flakes, or three short and wide blades, rough retouches in places, like the type of sharp point reminiscent of Abri-Audi, or blades with turned backs, but less typical than usual. Likewise, we find a sample of an ordinary microlithic arrowhead, with tang and curving. One or two pieces of elongated flakes or poor blades were slightly adapted into piercers (Stone Age Finds, fig. 89).

Finally, let us mention four elongated irregular flakes that have a more or less typical burin shape. One may be fortuitous, but two others would be fairly thick corner burins; and a third superficially resembles the parrot's-beak burin.

50. Vedbotneidet.

U. O. Årb., 1928, p. 60, No. 8. C. 24174 and A. NUMMEDAL: Stone Age Finds, p. 41.

This site was discovered by Nummedal in 1926. It is located on the tongue of land that leads to the bay closest to land to the north of the peninsula. It is exposed to the north wind, but otherwise well sheltered. The

knapped stones were on a terrace at the same elevation as the previous site (20 to 30 meters). The ground was a beach of fairly large cobbles. The pieces were collected mainly on the surface; some by digging to a depth of 0.30m (See view of the site in Stone Age Finds, p. 41).

The material is considerable and includes nearly 100 intentionally modified pieces. The raw material used was mainly a very suitable dark quartzite, even if it does not give such good flakes as the red-brown quartzite of the Varanger Peninsula. We also find other, more colorless quartzites, very little quartz and dolomitic flint. Obviously, mostly cobbles of the dark quartzite were used, because large pieces of this rock were barely used or even not used at all. On the other hand, the tool industry was quite crude. Only one piece was rolled or worn by water (Stone Age Finds, fig. 104).

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The use of cores is consistent with the cobble industry, as we have often observed it, with varying knapping, starting from one or more flat faces of the cobble, or from one or more crudely prepared percussion planes, without true flakes of the block. A very good example is provided by fig. 333 (pl. LXXVIII). It is the cap of a cobble with knapping starting from at least two sides, probably from several, but only on the side that we see in the figure. This is also the case for the piece in fig. 334 (pl. LXXVIII), except that it has three intentionally split striking planes around the perimeter. The knapping of such pieces is in reality the same as on the core discs, and we also find, among the pieces of this site, typical discs, cut on their entire surface, which sometimes produced fragments (pl. LXXVIII, fig. 335 and Stone Age Finds, fig. 110 b), not to mention small core discs, whose shape is less certain. The blade cores, few in number, are generally of poor quality, with the exception of that in fig. 336 (pl. LXXIX): it is the remains of an elongated core of flint, that provided excellent small blades.

Several cores have taken, through use, the form of tools; others certainly underwent secondary modification. As always, these are pieces with a more or less fortuitous sharp edge in the shape of an axe (fig. 333); even more often pieces of coarse flakes in the shape of a scraper (fig. 334); as an exception, thicker or thinner pieces with a beak or spur that can be used as a hammer or striker. The beautiful little core in fig. 336 has received a fairly flat retouch at one end, and which, combined with two rough removals of the lower face, gives it quite the character of a scraper on the end of a blade. Among these tools from the core, let us also mention a piece of cobble that was undoubtedly being transformed into a tool (pl. LXXIX, fig. 337). On one of the edges it has a strong sinuous cutting edge obtained by alternating removals, to the right and to the left, as in bifacial tools; as for the opposite edge, it is adapted to the hand (?) by crude transverse removals. Even in its present condition this piece was able to provide excellent service as a cleaver.

Another core-form tool is shown in Stone Age Finds, in fig. 95. It has a cutting edge like a sort of chopper, formed behind a flat, circular surface, carefully reshaped. The piece was perhaps a prepared core, but very little used, from which in reality only an ordinary blade was extracted, going from the heel to the cutting edge.

The implements of the site testify to a rather far-reaching flake industry. These flakes are generally quite large; only one is very large; but overall, they are usually larger than the cores of the site. The striking surface, when it is preserved, is plain or has coarse facets; the edges quite often show chips or crushing due to use. Curiously, several very large

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elongated blades or flakes are cut by transverse fractures. Although these have not been retouched, these pieces have a certain resemblance to tranchets. And if we judge by the traces of use, they served well as such. We have four of them, all of which have kept their base with the bulb of percussion, that is to say the part where the flake is the largest. These tools are cruder than usual, but they may very well be the outline of the "double tranchets" that are found at many sites (pl. VII, fig. 3). We also have here a real slicer; it is a beautiful little piece, almost quadrangular, well retouched laterally on one side (pl. LXXIX, fig. 338).

As always, scraping or scratching tools are in the majority. However, there are few typical scrapers. Besides the core scrapers of various shape that we have mentioned, and without mentioning the transverse or concave scrapers that will be discussed in connection with the blades, we only mention one very characteristic piece: it is a very thick scraper, strongly convex, roughly retouched at the tip with a long thick flake (pl. LXXIX, fig. 339). The piece is also cut along one edge, on the lower side, like a sort of scraper or knife. Naturally, we also find a certain number of scrapers retouched more or less roughly on fairly small flakes of any shape.

There are more numerous tools that, despite their differences, we group under the name of scrapers. One of them, quite typical, is retouched on the edge of a thin slice (Stone Age Finds, fig. 107), while the others fit more into the general type specific to the Finnmark quartzite industry and come from very thick flakes, or

from plates similar to cores, or even from pieces of rock. The flake is therefore coarse and fairly irregular (pl. LXXX, fig. 340). It is not uncommon to see large notches and beaks alternating in a way that cannot be fortuitous; it had to meet a specific need and allow scratching, impacting and drilling at the same time. A small irregular flake of flint is thus completely denticulated like a saw (Stone Age Finds, fig. 119).

In addition to these scrapers and scratchers of a more or less normal type, there are, as everywhere in Finnmark, other scraping tools of less certain form. Half a dozen fairly large and thick flakes were cut on the lower side, sometimes also on both sides. The percussion bulb has been removed, which gives the piece a false air of a core. The adaptation to scraping tools is always crude and rough. Combinations present themselves; thus the piece in fig. 341, (pl. LXXX) is, on the upper face, cut into a scraper on the right edge, while its widest end is roughly made into a scraper, with cutting of the lower face and modification of the upper face. Similar tools are common at other sites, for example at Smellroren.

Points. — At this site also, triangular flakes of varying quality and size were found. A little more than a dozen could, without

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modification, serve as a frame for shock or throwing weapons (pl. LXXX, fig. 342 and Stone Age Finds, fig.108). None of them shows any certain retouching, but almost all have slight chips on the edges, simple traces of use, or adaptation to forms closer to the Mousterian type. Other flakes certainly underwent intentional modification. One of them is roughly retouched on one edge on the lower side and two others along the back, which makes them resemble the pieces from Abri-Audi. On five triangular flakes of this kind we have found a sort of tang; two of these are very large and heavy tools, the tips of which are now broken. The retouching of the tang concerns the lower face (pl. LXXXI, fig. 343); other times it is alternated (pl. LXXXI, fig. 344) and arranged in such a way that these pieces could serve as concave scrapers. This is particularly the case of the first, which perhaps was retouched again as a scraper after the point had been broken. Originally, however, these were intended to be shock weapons. The piece in fig. 343 also has two notches on its edges, which undoubtedly allowed it to be fixed with a cord. The other three are smaller and regular shapes (pl. LXXXI, fig. 345); two are broken; that of fig. 346 (pl. LXXXI) has the shape of a burin and even shows a sort of irregular modification at the tip, like a retouched truncation. It is not impossible that this is fortuitous; if it is a spear point, the piece could have been broken by an impact.

Some pieces must also be considered as more or less typical burins. This is certainly the case of the one shown in Stone Age Finds (fig. 114): a double burin with obliquely retouched truncation. The burin marks are very characteristic because the rock (flint) is of excellent quality. Quartzite has also provided no less certain burins, either simple or polygonal.

When we have pointed out that there are also one or two coarse drills, we will have listed all the forms of tools characteristic of the site.

Besides the chipping industry, blades play a secondary role. In total, there are no more than a dozen real quartzite blades here, coarse, sometimes very thick. Most bear traces of use, without the slightest modification. As usual, we find examples of scrapers retouched on the tip of the blade; two pieces have fracture notches on the edge. Only two broad blades are of more interest: they are retouched along a convex back. On the piece in fig. 347 (pl. LXXXII), this retouch is flat; on the other it is abrupt. The edge opposite the back is sharp; on the piece not shown, it has even undergone fine retouching. It is hardly possible to see scrapers or scratchers there, but rather some kind of knives. They are very close to French Mousterian pieces of Acheulean tradition.

The microliths are very few. Of two small strips of black flint, one is retouched on the back, towards the tip only, into a small

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knife blade. The other (fig. 31d), following a good dorsal retouch, took the shape of a half-moon. It also shows fairly flat retouches on the percussion bulb, which is not very rare at Finnmark sites. A small (?) thin flake served as a core. It has undergone bladelet knapping, longitudinal on one side, and transverse on the other. The piece has a flaky edge that seems to be due to this operation.

51. Russedalen.

U. O. Årb., 1928, p. 67, No. 10. C. 24176 and A. NUMMEDAL: Stone Age Finds, p. 50.

This site was discovered and explored by Nummedal in 1926. In 1934, he brought back some more cut stones. It is located on a sandy ridge, towards the top of the valley, and on the south bank of a stream that passes through the sandbank. The elevation is 49 meters. The Tapes shoreline, according to calculations by M. Martbinussen, is 22.50m above sea level, and the late glacial shoreline is 58.50m (see view of the site in

Stone Age Finds, p. 53). The pieces were collected mainly on the surface.

Raw material. — The pieces collected are quite numerous, 127 in total. A few are of gray quartzite and only one of quartz. The rest are of gray or quite dark dolomitic flint, sometimes with lighter veins or spots. Cobbles were used, at least partially. But we also find a thick triangular plaque (length: 0.10m; thickness: 0.04m) of dark flint that shows traces of retouching or knapping all around. It thus took the form of an enormous keeled scraper at one of its ends, and on one side, the form of a slightly convex scraper. In general at this site, the flint pieces are quite large and the tools cut from this rock are coarser than usual. Flint must have been very abundant, but it did not give rise to heavy industry. On the other hand, one or two coarse instruments are made of quartzite.

Implements. — There are at least two dozen cores, most of them made of gray flint. They are generally small and their length ranges from 0.03m to 0.045m. It is necessary to set aside a sub-rectangular block (0.075m by 0.05m) that has undergone transverse removals on one side. On the opposite side, large longitudinal removals resulted from blows to one of the ends. The last removal left a sharp edge that could have been used for scraping. The piece is reproduced in Stone Age Finds, fig. 123. The other pieces are of varied shape; one is almost conical, most are more or less flat, sub-rectangular, sub-triangular, etc., and bear traces of the removal of more or less successful short blades. Others, which provided flakes or very large and short blades, should rather be considered as atypical kinds of discs. One or two,

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following intensive knapping on both sides, took the appearance of thin plates (thickness: 0.01m; see also Stone Age Finds, fig. 125); one or two others, less used, have, as a result of knapping or cutting on both sides, the shape of two-sided oval tools. The least typical, shown in fig. 348 (pl. LXXXII), results from knapping starting from a very oblique faceted striking plane. It has a sharp edge that could be suitable for cutting or scraping. Only one piece has a spur at one end and has probably been retouched with a scraper on one edge; it is shown in Stone Age Finds, fig. 126.

The cutting of blades is very varied, with or without preparation of the striking plane, which, almost always, forms a more or less acute angle with the fracture plane. Also these small, widely used cores almost always take on the appearance of scrapers when the percussion plane is faceted. This is often, undoubtedly, the effect of chance, but sometimes also of intentional modification.

This site offers a fairly considerable number of blades of varying size and quality, while the flakes are of any shape, and for the most part waste of knapping. Blades and flakes are generally small, but significantly larger than cores. Several show signs of use on sharp edges.

Although the material collected above all offers the character of a blade industry; few of them are really good and equipped with characteristic tools, scrapers or burins for example. Most of the intentionally made instruments come from flakes of any shape, as has been said, or from thick or core-form pieces of rock.

Once again, the richest group of tools is that of the scraping instruments, with very rough retouching in general. We find most ordinary shapes: fairly small scrapers on the end of the blade, on the edge or on the point of flakes; larger and heavier scrapers, cut on flakes or on slabs of rock. Three pieces are retouched on thick, core-shaped blades, like a sort of keeled scraper. A flint plate, narrow and fairly thick, is fitted on one side into a concave scraper (Stone Age Finds, fig. 134). A thick flake has also been retouched on one of its long, slightly convex sides (pl. LXXXII, fig. 349). The useful edge is completely chipped by use.

Retouching is often carried out on the lower side. It is generally very rough, sometimes light or even barely visible. A more vigorous cutting is however observed on larger and heavier instruments, for example on a toothed scraper, shaped at the base with a triangular flake similar to that in fig. 141 (pl. XXXIII).

Next comes a fairly large number of burins. In addition to many very doubtful or coincidental pieces, we have two dozen that appear certain, although the shapes are on the whole not typical. Curiously, there are few simple angle burins on broken (unretouched) blades. Burins on blades

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Fig. 32. Scraper on thick flake (a) and thick scraper (b), Kolvik. Burin scraper on flake (c), Russedalen. Quartzite and flint. Natural size.

are few, and among these, only one results from a burin cut perpendicularly along the edge of the blade. On the other hand, one or two pieces have a burin cut on one corner, which partially or totally affects one of the faces; they are a sort of plane burin (pl. LXXXII, fig. 350).

There are also some multi-faceted burins (pl. LXXXII, fig. 351), and one could add the very vigorous sample shown in Stone Age Finds, fig. 135. Some pieces also show transverse retouching on the edge on the thick side of the blade, reminiscent of a small busque burin. Two others come from narrow and elongated

cores of irregular shape and show long facets that abut on a large oblique projection, similar to the polyhedral burins of Bourlon (Stone Age Finds, fig. 128). Most, however, are the simple forms, the burins shaped on large flakes by two intersecting burin strokes, or by one or more burin strokes perpendicular to a fairly thick edge, or locally retouched (fig. 32 vs). Sometimes we find double burins, or burins combined with other tools, for example a terminal or lateral scraper (fig. 32c and Stone

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Age Finds, fig. 130). Two thick broken blades seem to have their fracture arranged into a burin, and their opposite end shaped into a hatchet or scraping tool by retouching the lower face (pl. LXXXIl, fig. 352).

Alongside these two groups of intentional tools we find others that are perhaps fortuitous. Let us also mention two triangular flakes, one of which has small fracture notches on the edges, the other being cut on both sides, perhaps to form a piercer. On the other hand, a thin rectangular plate, one edge of which is naturally sharp, resembles the simple slate knives of the Eneolithic of southwestern Scandinavia. The edge is chipped by use. Finally, let us mention a thick sub-triangular flake that has a deep notch towards the tip, undoubtedly intentional, with retouching of the opposite edge (Stone Age Finds, fig. 133).

Microliths are few in number; they are blades, four of which have a fine blunting on the back, near the tip; three were adapted into tanged arrowheads, very roughly retouched. A triangular chip, small and wide, cut along the back, resembles the points of Abri-Audi.

52. Kolvik.

U. O. Årb., 1928, p. 70. No. 12. C. 24178 and A. NUMMEDAL: Stone Age Finds, p. 57.

This site was also discovered by Nummedal in 1926. It is located at the lower part of Russedalen, just north of the new road. There is a small mountain ridge there that is flat at the top and where the site is located, at an elevation of 44 meters. Most of the objects were collected on the surface, first in 1926, then in 1934, during a brief stay.

The raw material includes various quartzites, especially the dark gray quartzite found at all the sites in this region. Some small flakes are quartz. In addition, a dark dolomitic flint with lighter veins was often used, which works well when it is pure. The pieces collected are quite few in number, around a hundred in total, only a few of which are real tools.

Implements. — There are about two dozen cores and core-like blocks. Most of them are small pieces of dolomitic flint, which provided very short blades or flakes. Their shape is irregular, more or less prismatic, most often sub-rectangular. In the latter case, the cores are extremely used, and many resemble thin pucks whose edge, suitably cut, can form a hatchet or a beak, or take the shape of a scraper, etc. Almost all of these small cores appear to have been reused in one way or another; this is how a prismatic core was

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characteristically a retouched core-form scraper; but the shapes are quite irregular. The quartzite provided only three cores here. One, discoid in shape, large and thick in clear quartzite is cut all around; it provided a flake by a blow on a striking surface following the removal of a first flake, and, consequently, without facets (pl. LXXXIII, fig. 353). Another core, rather discoid but irregular and elongated, is made of dark quartzite. It underwent longitudinal and transverse removals, probably during tool modification (Stone Age Finds, fig. 139). Finally, a third core of the same rock, which was used a lot, could be reused as a very crude scraping tool.

At the same time as the cores, let us cite the tool in fig. 354 (pl. LXXXIII); it comes from a flake, but it is modified all along the edge on the lower face, like the mysterious "throwing stones" of the Mousterian.

Good flakes of knapping are limited in number; some, despite their rough condition, bear traces of use. There are many more blades; they are what give the site its character. Around thirty have been found, sometimes of flint, but mainly of quartzite. There are large and wide ones, long and medium ones, and the quality varies. They also often have chips on the edges, but not very many have been made into tools.

Real characteristic tools are also quite rare. Once again, scraping tools are in the majority and these are the ordinary shapes that we see: a fairly large blade, with transverse retouches like a scraper at the end; a few medium chips of any shape with local retouching; two thick flakes, the edge of which is roughly recut on the lower side. Only three pieces offer more interest. One (see fig. 32b) is a thick scraper, finely retouched into a fan at the end of a core-form flake; it was undoubtedly sharpened by a large removal of the lower face. The second is an enormous scraper or scratcher roughly made on the edge of a thick quartzite plate (pl. LXXXIV, fig. 355). The third is a sort of scraper, as we have often found in the quartz industry: a core-form flake, thick and rhomboidal, retouched only on one of the edges (fig. 32a).

Besides four small flakes of quartzite and flint, that resemble, no doubt by chance, the shape of burins,

only five microliths remain to be mentioned. Of these, three are certainly arrowheads, with retouch only localized on the tang (fig. 31f); the fourth is a small broad blade, with a turned back, and the fifth is probably a fragment of a similar piece (fig. 31e).

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53. Storbukta.

U. A. Årb., 1928, p. 72, No. 13. C. 24179 and A. NUMMEDAL: Stone Age Finds, p. 61.

About 3 km north of Kolvik is a bay called Storbukta. North from there is an isthmus towards Trollholmsundet. On a terrace above Storbukta at an elevation of 42 meters, Nummedal found a site in 1926[1]. He briefly explored it again in 1934 and brought back a few more cut stones. Here too, almost all the pieces were on the surface.

Raw materials. — The find is important. A kind of dolomitic flint was used, most often dark with light veins; in addition, many varied quartzites. As usual, the large coarse tools are mainly made of quartzite, and the small ones preferably made of dolomitic flint. A striker comes from an ordinary quartzite cobble (weight: 440 grams).

At this site the flint is generally of poor quality, uneven and porous. This explains the treatment that the dolomitic cores underwent. There are almost a hundred small blocks of this kind here that can be characterized as real cores. They do not exceed 0.06m in the direction of the largest dimension and their shape is very often irregular, because of their very extensive and very varied use, with knapping on the places where the block offered a tight grain and a suitable striking surface. It is therefore very difficult to distinguish flake cores from blade cores, although some pieces have rather one or the other character.

The core sub-discs are the most numerous as always; some are flattened and thin; others are cut like "throwing stones", etc. They were very often reused in various ways, above all as scrapers, following a more or less rough retouch in the appropriate places. The result is that these scrapers often have completely accidental shapes, but we also encounter true core-form scrapers, derived from bladed cores (Stone Age Finds, fig. 149). There are also kinds of planes or thick scrapers with fan-shaped retouches resembling very wide keeled scrapers, or vice versa, with beaks shaped into a snout by notches or by retouches (Stone Age Finds, fig. 150−151); other scrapers are made on the thin edges of a core, much like blade scrapers. Sometimes on the edges of thin discoid cores, we observe beaks or spurs, isolated by fairly large removals or by retouching. These protuberances appear either alone as a sort of burin, or more often associated with scrapers,

[1] One will find a more detailed description of the site in Stone Age Finds, p. 51.

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Fig. 33. Storbukta: discoid tool with two small beaks, partially retouched into a scraper. Flint. Natural size.

laterally or in the middle. One of these curious tools is shown in fig. 33 in the text; it is a thin ovoid disk that is cut all around its circumference. On one side it has a protruding point that results from retouches with a scraper on a face and from a removal to the other face, and which is furthermore rendered sharper by secondary removal on this last side. The opposite side shows a convex scraper that has a slightly sharp beak formed by two parallel recesses on the lower face.

Very often, thin cores have one or more sharp edges. Most of the time they are accidental, but they can also be made by alterations or enhanced by removals. A beautiful little tool of this type is shown in fig. 356 (pl. LXXXIV); it is a small sub-discoid core of flint; on one edge it is formed into a thin hatchet, the edge of which is formed by two alternating notches (concave scraper). The relatively thick heel is roughly cut into a scraper and sharpened by a concave removal of the lower face.

There is no definite large or medium core here. A single pear-shaped block of flint, 0.095m long, is recut over its entire perimeter. It has crushed parts, as if it had served as a striker or suffered impacts against the anvil during knapping, but it bears no trace of intentional knapping of blades or splinters.

On the other hand, there are other tools made directly on blocks. The remains of a cobble, first used as a core, was then recut on the edges and at the point almost like a true amygdaloid punch. A quartzite tool, smaller and of similar shape, but coarser, is retouched all around. Along with these shock weapons, let us cite three pieces that also come from blocks or thick flakes, cut into a point at one end, with a heel well adapted to the hand (pl. LXXXIV, fig. 357 and Stone Age Finds, fig. 143). There are also some fairly large cores and blocks that have been made into the shape of an axe, or by secondary retouching, into real choppers, with a straight or more or less sinuous edge. Sometimes, the nature of the flake makes it difficult to tell whether one is dealing with a cutting tool or a very heavy scraping tool, or both. Fig. 358 (pl. LXXXIV) shows one of

these tools; it is the remains of a cobble, roughly cut on both sides.

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Despite the absence of a core of corresponding size, the site has many large flakes; one of them with a very oblique striking surface and a large percussion bulb (of the "Clactonian" type), shows crushing on the edges due to use, and a beak limited on the one hand by the angle of the percussion plane and on the other by a deep notch (Stone Age Finds, fig. 159). Most of the other flakes, and there aren't many, have been adapted into tools.

There are more blades. Many have traces of use on the edges, without other modifications. Many others are converted into tools. Their quality is generally mediocre and, even more than at other sites it is difficult to clearly distinguish the flakes and the blades. Therefore in the following lines we will talk about groups of tools under one and the same heading.

Implements. Sharp tools. — Besides the hatchets, accidental or not and coming from cores, which we have spoken of, only one tool is really an axe. It comes from a thick flake by local modification of both sides and by retouching on one edge; it retains the natural sharpness of the flake, in the manner of slicers (Stone Age Finds, fig. 164). Moreover we also find flakes with used natural sharp edges that were retouched for gripping; they can also be combined with other tools such as scrapers (pl. LXXXIV, fig. 359).

Scrapers. — A dozen pieces must be considered as real scrapers. A very typical small example is shown in fig. 360 (pl. LXXXV). It is cut by fairly long removals on the edge of a flake whose heel is adapted to the hand by retouching the lower face. In other scrapers, only the useful part received attention, the rest of the flake being in its natural state or adapted for other uses. Thus fig. 361 (pl. LXXXV) shows a flake that is formed into a good scraper on one edge, and whose other very sharp edge is provided with two fracture notches; There is also a thin burin at the tip. Also two of these thick scraping tools that we often encounter are thick and often rhomboidal, cut one-sided or two-sided. One of these pieces is shown in Stone Age Finds, fig. 147.

The scrapers are, once again, extraordinarily numerous. Besides the true core scrapers and the random scrapers coming from transformed cores, etc., there is a host of scrapers of various species. Overall, however, we must agree that the shapes are not very characteristic. Most often, they are retouched on flakes or blades of accidental shape, and with very rough work, sometimes even neglected. True keel-scrapers are absent; but four strong quartzite scrapers have some of the character (Stone Age Finds, figs. 152, 153). A few flakes of flint or quartz, with abrupt retouches (in the form of facets) around the edges, are undoubtedly "tranches d'avivage"

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keeled or core scrapers, although they have undergone secondary modification into scrapers (pl. LXXXV, fig. 362). In this regard, let us also cite (Stone Age Finds, fig. 155) an oval scraper on a flake, with retouching on the edge of the lower face, and with corresponding modification of the opposite (or upper) face. In addition, scrapers are found on the ends of blades, on elongated, concave or convex flakes, or in the shape of a snout (Stone Age Finds, fig. 161, 157), but they are never cared for.

As at most sites, there are atypical scraping tools here, made by retouching the lower face, often combined with oblique removals of the opposite face that produced edges or notches of various shapes. Very often, this operation removes the bulb of percussion or affects the striking plane. Some of the best scrapers were thus obtained by retouching the fracture plane.

There are only a few large and heavy scrapers. In reality, we can only cite two, obtained by rough removals from the ends of large flakes of quartzite.

Retouched blades. Points. — As has been said, real blades of flint and quartzite are quite numerous. Most of them have usual chips on the edges, with no trace of damage; others have marginal retouches (Stone Age Finds, figs. 179, 184), or, as an exception, marginal notches. (pl. LXXXV, fig. 363). This is rare for fairly large blades, just as it is rare to see large blades retouched into real tools. However, there are some, large and wide, of quartzite and flint, that show a retouch on one edge and a cutting edge on the other. In one case, the dorsal retouches are long, which gives the piece the shape of a scraper-knife (pl. LXXXV, fig. 364); but in other cases, the retouching is abrupt, like a real reduction. Most often, however, the retouching only concerns the part of the piece that immediately precedes the point, forming an modification for the finger (fig. 365, 366, pl. LXXXV, LXXXVI). The cutting edge has chips from use.

On a smaller scale, such tools are quite numerous, retouched on short blades, or on flakes of suitable shape, or even on fine blades, almost always with the same incomplete retouches as on the large blades. The shapes are roughly like knives from the Neolithic, or blades with blunted backs from the Upper Paleolithic; through many transitions, we arrive at the sub-triangular points, wide and short, with more or less complete

retouching along a convex back, resembling the type of Abri-Audi. Occasionally the retouching is very fine, almost microscopic; but most often it is a very typical drawdown. It can be steep and sometimes even quite long, made on the upper side or the lower side, or on both

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alternately. The tip is sometimes more elongated, sometimes wider; sometimes it is cut in the shape of a fairly characteristic half-moon (Stone Age Finds, fig. 183a). There are about three dozen pieces of this type, a selection of which can be found in figures 367−371 (pl. LXXXVI).

An original form is that of fig. 34a: it is a tapered blade that is cut pointed at the end and has the bulb of percussion and shows a shipped dorsal side. It is of the Aurignacian or recent Neolitic type; on the other hand, the point itself is cut on both sides, with a flat retouch that makes one think that the shape of the piece is Proto-Solutreen.

Of two large tanged points, one is wide, and the blade, broken at the tip, and blunted over one edge; in the other, this same part remained without retouch (pl. LXXXVI, fig. 372). These are in reality only large examples of the small tanged arrowheads, of microlithic size, that we find at many sites. At this site there are twelve. Of this number, only two show ordinary retouch or dorsal blunting (Stone Age Finds, fig. 186). For all the others, the leafy part is not retouched (pl. LXXXVI, fig. 373, 374). With the blunted back bladelets, these are the only microliths at the site.

Burins. — A host of flakes with sharp angles imitate the shape of burins. They are for the most part, without a doubt, waste to which chance has given this form and they are of no interest; but careful sorting allows us to retain around 40 pieces that can be considered as real burins. Of these, only a few come from fairly good blades. Almost all are cut on flakes of suitable shape, more rarely on cores or core-form pieces. The technique is the one we know, but schematic and rough; so we hardly find beautiful regular burins, and even truly typical pieces are rare. We also note many notable shapes: frequently, and perhaps by chance, burins with a median bevel, obtained by two blows given to form a sort of flute mouthpiece (pl. LXXXVI, fig. 375); sometimes the place of one of these removals is made by a simple oblique fracture or by a thick natural edge. This brings us to the burin resulting from a blow perpendicular to a fracture, but parallel to the edge of the blade or the splinter, therefore to a sort of angle burin on a broken blade; this latter variety also exists as a few examples (pl. LXXXVI, fig. 376; see also the exceptionally robust piece from Stone Age Finds, fig. 165). We also find burins with retouched, oblique truncation (Stone Age Finds, fig. 173, 174, and here, fig. 34b), and more rarely transverse. Finally, we find thick burins made on thick cores or thick flakes, by one or more burin strokes or parallel to the edge of the piece and perpendicular to a plane, modified or not. This results in very varied shapes, some of which are multi-faceted corner burins (Stone Age Finds, fig. 166, 170); others are similar to busque burins.

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Fig. 34. Storbukta: bladelet with turned back and base enhanced by flat retouches, corner burin, blade with gouge end and lateral retouches. Quartzite and flint. Natural size.

To conclude, let us mention only a few samples isolated from others tools, such as piercers, etc. Alone, a type of which we have four copies offers some interest. It is a kind of gouge, which results from a concave removal transverse to the tip of an elongated blade or flake (pl. LXXXVII, figs. 377, 378; fig. 34e; Stone Age Finds, fig. 178). One of these pieces is double. The cutting edge is always obtained by unilateral removal, which allows the use of this tool as a very fine plane. This removal only shows secondary retouching in the case of fig. 378, where the gouge is combined with a side burin. In contrast, on two pieces the edges of the blade are finely retouched in the part adjacent to the terminal gouge (fig. 34c). But we cannot say whether this retouching is before or after the formation of this gouge and if, for example, it is the remains of a scraper on the end of the blade, or if is was intended to make beaks similar to lateral burins.

54a. Børselvneset I.

U. O. Årb., 1928, p. 85, No. 17. C. 24183 and A. NUMMEDAL, Stone Age Finds, p. 80.

The Børselv River flows into the fjord on the eastern shore of Porsangerfjord, almost opposite Kolvik and the three preceding sites. On the north bank of the river is the point called Børselvneset, where Nummedal in 1926 discovered a site south of Leirbukta. It is located on an ancient beach, at an elevation of about 40 meters, between dolomitic rock formations. The cut stones were almost exclusively collected from the surface. Diggings yielded almost nothing. A view of the site is found on p. 81 in Stone Age Finds.

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About 120 pieces were collected. The raw material is mainly quartzite, and preferably a dark quartzite. For small tools, some flint was used. Three small pieces are made of quartz. Two others are rolled and very worn by water (Stone Age Finds, fig. 222).

Implements. — Obviously, cobbles were mainly used, as the surfaces are found in more than one place on the pieces, including the chips and the blades. The striking planes of these pieces are united, or formed by a rough fracture plane, or they are faceted. This means that the raw cobbles were taken as the core, and the knapping took place by blows, either on a flat part of the polished surface, or on striking planes arranged on purpose, sometimes united (at the following a single rough removal), sometimes prepared by facets.

Originally, these core cobbles must have been very large, because blades and flakes up to 0.12m in length were obtained from them. These objects, on the whole, are quite crude. At least three core cobbles of this type were found, all with a faceted, very oblique striking surface. One is a real thin disk that seems designed for removing fragments (pl. LXXXVII, fig. 379). Another, probably also discoid in origin, is irregular and perhaps adapted into a sort of atypical shock instrument (Stone Age Finds, fig. 197). The third, sub-rectangular, provided blades by knapping starting from two opposing striking planes (prepared), fig. 380 (pl. LXXXVII). The piece in fig. 386 (pl. LXXXIX) also seems to have originally been a core for blades, coming from a cobble, subsequently transformed into a double scraper.

The flint provided a small number of cores, from which blades and blades and bladelets were removed and which were used to the extreme; they have then for the most part been transformed into tools: scraper, point (pl. XCI, fig. 393), or burin (pl. XCI, fig. 396). Finally, we find here three of these small thick cores or discoid blocks that we encountered in several places in the quartzite industry: these are probably the remains of the cores, used as long as possible and sometimes reused as scrapers or impact instruments, because they have a sinuous edge on more or less extended parts of the perimeter.

Among the blunt instruments, we also find a very large, cordiform piece; it comes from a cobble and has undergone almost complete bifacial cutting. The point is sharp, the edges sharp; an angle of the heel is perhaps modified as a heavy scraper (pl. LXXXVIII, fig. 381). In addition, there is a cobble, one end of which has been sharpened into the shape of a cutting edge by a rather crude two-sided cut (pl. LXXXVIII, fig. 382).

Tools derived from flakes. — The implements are characterized by a crude and heavy industry of flakes. There are many large or medium chips without modification, with edges crushed or retouched by use, or with a slight

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Fig. 35. Børselvneset: tip curved with long dorsal retouches on the lower face, arrowheads on the back and tang. Quartzite and quartz. Natural size.

retouching of certain parts. The striking surface is sometimes faceted, and sometimes plain. Here, the flakes are of the "Levallois" or "Clactonian" type. Some samples are shown in figs. 383−385. The one in fig. 383 (pl. LXXXVIII), has a faceted striking surface, has slight chips on the edges, but shows no intentional modification other than a notch at the tip and a notch on one of the edges. The one in fig. 384 (pl. LXXXIX), now oval, has been roughly adapted and shows a retouched notch on one of its edges; the striking surface is recut and the percussion bulb has disappeared. The one in fig. 385, with a plain and oblique striking surface, was roughly retouched on one edge, both before and after knapping, which gave it, at the point, the shape of a very crude burin.

One or two smaller pieces seem to have been slightly retouched as narrow scissors, unless they are false retouches produced by shocks (Stone Age Finds, fig. 207−208).

Most of the intentionally modified tools were also cut or retouched on flakes.

The scrapers, more or less typical, five in all, are cut rather roughly, with a straight or convex edge; one of them results from a two-sided cut. We also find one of these well-known thick double scrapers, with a thick and rhomboidal cut, the two edges of which are shaped into a scraper (pl. LXXXIX, fig. 386). The rear face of the piece (fig. b) is formed by two flat faces of the surface of the original roller. This piece appears to be the remains of a rectangular core, with a very oblique percussion plane at both ends, like that in fig. 380 (pl. LXXXVII). Both ends seem be made into very coarse scrapers. A very interesting multiple tool is also that of fig. 387 (pl. LXXXIX); it's a thick flake, retouched to a scraper along one of the edges; on the other edge we notice a large notch, surely intentional, but not retouched, and in addition a crude scraper on the edge of the plane (bottom right). The opposite end has been retouched with a beak made by two notches.

Contrary to what we observe at many sites in Finnmark, there are real scrapers here retouched on thick flakes. The result is often quite heavy and robust tools that can imitate scrapers on blade ends

(pl. XC, fig. 388), oval scrapers, etc. The retouching is often carried out on the lower face, sometimes even on the striking surface (Stone Age Finds, fig. 199); or it alternates on both sides. An excellent example of this latter way of proceeding is shown in fig. 389 (pl. XC); following an alternating cutting of the edge, it shows many cutting or scraping parts, straight convex or concave. In general, it is quite common for usable flakes to be cut on the underside in a way that often eliminates the striking surface and the bulb of percussion. The tools thus obtained, however, are more or less fortuitous.

A number of flakes and large blades have been made into points of varied shapes. Some triangular flakes with slightly altered edges are of the Mousterian type (pl. XC, fig. 390). Three triangular flakes have a roughly made tang (pl. XC, fig. 391 and Stone Age Finds, fig. 212). In addition, three long flakes or thick blades, have, in preparation for fitting, undergone longitudinal removal at the base and, moreover, have been slightly retouched on the edge of the blade (pl. XCI, fig. 392). On the other hand, there are some pieces that show alterations of the upper or lower face, forming a curved back, as in the points of Abri-Audi (fig. 35b). One of them was shaped from a flint plate, which is in reality a very thin core, still showing the trace of the beautiful strips that it provided (pl. XCI, fig. 393).

Besides the flakes, the blades play a secondary role. There are a few blades of coarse quartzite, almost all with traces of use on the edge. Only one, very good, is retouched with a scraper on the end of the blade (pl. XCI, fig. 394); another beautiful blade has a dorsal blunting near the tip (pl. XCI, fig. 395) and some light retouching, with traces of use on the edge. The flint provided also a few small strips; one of them is irregularly retouched along the scraper edge (Stone Age Finds, fig. 226).

Some flakes and coarse quartzite blades have removals starting from a fracture, like a burin. But the real burins, made of good stone, are only three in number: one of them is short and comes from a thin core that has received two burin blows in opposite directions, forming a flute mouthpiece (pl. XCI, fig. 396); another, of flint, is a double corner burin with thick and retouched truncation (pl. XCI, fig. 397), and the third a thick burin of fine quartzite, with polygonal retouch (pl. XCI, fig. 398.)

Of microlithic tools, besides a few bladelets, there are only three arrowheads, one of which is a simple tanged bladelet, while the other two have abrupt dorsal retouches (fig. 35b, c).

54b. Børselvneset II.

U. O. Årb., 1928, p. 92, No. 18. C. 24184 and A. NUMMEDAL, Stone Age Finds, p. 91.

The site is about 50 meters east of the previous site and a few meters lower elevation, going down towards the valley that ends at Leirbukta.

Only four large pieces were found there, of the same and excellent gray-brown quartzite that we have already encountered; they undoubtedly come from the knapping of the same block. These are: a large convex scraper, retouched at the tip of an elongated flake, similar to the spoon-shaped scrapers of the recent Neolithic; an elongated blade, sharpened at the point like a burin; a thick and coarse blade with small removals at the tip and finally the base of a flake reminiscent of Levallois flakes.

According to Nummedal, these pieces come from a chance stay at this site.

55. Steinsneset.

U. O. Årb., 1928, p. 82, No. 16. C. 24182 and A. NUMMEDAL, Stone Age Finds, p. 75.

This site is located on the western part of the small peninsula that juts out at the very end of Porsangerfjord, between Austbotn and Vestbotn; Nummedal discovered it in 1926 on a terrace 60 meters above sea level. He collected the objects on the surface and did some excavations. The pieces, 96 in total, are mostly made of dolomitic flint; a little quartzite and very little quartz and hornstone were also used.

They are generally small. This is also the case for the cores, of which we have a dozen (one of quartz, the rest of dolomitic flint). They are all irregular, undoubtedly remains of cobbles very reduced by prolonged knapping on different planes. One of them is reduced to a very thin rectangular plate, with scaled cutters at both ends (length: 0.025m), just like in fig. 268, (pl. LX) at Smellroren. The piece is shown in Stone Age Finds, fig. 192.

An almost spherical cobble, now very weathered, may have served as a hammerstone for knapping and debitage.

Another tool for shock comes from a fairly thick flake, by retouching the upper face and slight modification of the shattering plane; it looks like a sharp punch. Length: 0.071m.

A thin flake of hornstone is similar to the small sub-rectangular slices that are found at some sites. The edges are cut starting from the lower face, which has also undergone a slight modification. The percussion

plan,

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as usual, was on one side and was removed; the cutting edge, which is constituted by the naturally sharp edge of the flake, has small chips from use. Length of the piece: 0.041m. The tools used for scraping or scratching are, as usual, very numerous. Only one is a real scraper with a convex edge, shaped on the edge of a quartzite flake; on the other hand, scrapers abound. Besides the cores that were slightly adapted or used as scrapers, four such pieces were made at the tip of medium-sized blades, and another at the tip of a long thin flake. Two others are almost oval (Stone Age Finds, fig. 189); one is knapped alternately. A fairly large flake, and another smaller one, are retouched like long concave scrapers; a small flake shows a deeply retouched notch. Three flakes are retouched into scrapers with thin muzzles.

The site provided 8 small sub-triangular points of the ordinary type, with retouching on the lower or upper face, along a convex back, like the points of Abri-Audi. The shape of these tools is more careless than usual and their size very modest (from 0.033m to 0.046m). There is only a small arrowhead with a unilateral edge, with tang and dorsal retouches (length: 1.024m). The blades play a small role here. They are few in number and their quality is mediocre. However, we have fragments of two fairly large blades, one of which has undergone dorsal blunting, and the other has abrupt retouches on the lower face, along both edges.

Among other tools, we can only mention two atypical piercers, as well as a flake cut from the surface of a quartzite cobble and retouched into a scraper at one end; the other end has a burin, undoubtedly fortuitous, because the burins are absent at this site. This piece is shown in Stone Age Finds, fig. 191.

Alta Sites.

Next comes, all the way to the west, a region rich in sites, that of Altafjord. In the interior and almost at the end of the fjord we have Bossekop I and II, Tollevik, Steinseng, and Amtmannsneset; finally, further out on the west bank of the fjord, Isnestofta (see fig. 36).

Fig. 36. Detail of the map in the Alta region.

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56. Bossekop I.

U. O. Årb., 1931−32, p. 222. No. 64. C. 25143 and 1933−34, p. 80. C. 25467.

West of Komsa (the Mount Kongshavn), a plateau extends towards the southwest in the direction of the Bossekop parish. The road from Bossekop to Bugta and Altagård crosses it. To the west, the land slopes sharply towards the fjord and in a southeast direction towards the Alta River. On this plateau, an ancient terrace marks the late glacial shoreline; according to Mr. Marthinussen's leveling, it is at an elevation of 69.20m above current sea level. The antiquities were located on this terrace, on the surface and at a shallow depth, and especially near the Pin that we see in the middle of the photograph pl. VI. Nummedal discovered this site in 1931 and visited it again in 1932 and 1934. In total, it yielded 138 pieces, including small waste.

As a raw material, a black dolomitic flint or a hornstone resembling flint was widely used; in addition, a little quartz and different quartzites. Most of the time, cobbles provided this raw material. We thus find a medium-sized quartz cobble with traces of removal and another, in brownish quartzitic sandstone, which has undergone two-sided cutting on one edge. The cutting edge has small crushed parts, perhaps after having served as a sharp striker. Some pieces at the site were quite heavily rolled.

Implements. — More than twenty pieces are more or less typical cores. Two, made of flint, are cut all around and have taken the globular shape that we have often observed, especially for quartz pieces. Some others have partly retained their discoid form (pl. XCII, fig. 399). The rest is quite irregular in shape. Some, widely used, have crushed edges or cutting edges that distinguish scaled tools (pl. XCII, 400 to 402). As usual, several were reused as scrapers. The one in fig. 403 (pl. XCLL) shows on different planes, two scraping parts, one of which resembles the careened scrapers

The blades are numerous, most of them quite coarse and with traces of use. Only a few have been converted into tools. Most instruments come from knapping of flakes or flakes of any shape.

Let us first mention a limited number of striking instruments or cutting instruments, for example a medium flake of quartzite, with a thick and triangular cut, roughly tapered at the point by a few removals (pl. XCII, fig. 404). In addition, a smaller flake, made of flint, cut on both sides, resembles a pointed impact instrument (pl. XCII, fig. 405). Basically, it appears to have been roughly converted into a scraper. Finally, a triangular flint flake is retouched, on the edge into a Mousterian type point (pl. XCII, fig. 406).

Fig. 37. Burin, small scraper and notched blade. Bossekop I (a) and II (b, c). Quartz and flint. Natural size.

Two flakes are roughly cut as scissors, one of which is combined with a scraper (pl. XCIII, fig. 407). Another quartz flake has the shape of a double tranchet (pl. XCIII, fig. 408). The cutting edges appear to be used, but that may be because the piece has been a little rolled or worn by water. There is also a very atypical hornstone tranchet. It has some chips of usage and a fine retouch on one edge.

For the fairly large tools used for scraping or scraping, quartz and quartzites were used, as usual. Some are real scrapers, with the coarse flakes required by the nature of the rock (pl. XCIII, figs. 409 and 410). These tools also show, after modification of the lower face, parts that are for cutting or scraping, straight, convex, concave, or beak-shaped. Some very coarse scrapers were cut on the edge of thick quartzite flakes. The smaller scrapers are retouched on small flakes or small blades of quartzite and especially flint. Here again, most of the scrapers have more or less accidental shapes, because they come from flakes of any shape, after very rough retouching. Fig. 411 (pl. XCIV) shows a flake that has a convex scraper on one edge as, combined with a thin and sharp beak that may have served as a piercer. A single scraper can be characterized as an atypical keeled scraper. Others are made on the tip or edge of a blade. Both cases are observed in the piece in fig. 412 (pl. XCIV), which is very worn by water. It is quite large, but half a dozen other scrapers are very small, almost microlithic; they come from bladelets or flakes. A flake with finely retouched notch is shown in fig. 413 (pl. XCIV).

The tools that from their shapes are possibly burins number about a dozen. One, made of flint, leaves no doubt; it is an angle burin with oblique truncation (pl. XCIV, fig. 414). The others are less certain, either because the raw material is less good (quartz, quartzite), or because they were made without retouching, by cross-cutting (pl. XCIV, fig. 415), or even by cutting obliquely or perpendicularly on the side of a fracture (fig. 37a). Only one has irregular facets on a wide edge, probably due to a burin cut (pl. XCIV, fig. 416).

Finally, let us remember that there are some tools of microlithic size and character. In addition to the small scrapers that we have mentioned,

two thick lamellae have dorsal retouches near the tip (pl. XCIV, fig. 417, 418). and two arrowheads, larger than usual, are retouched on the lower surface on the tang and locally on the leafy part of the blade (pl. XCIV, fig. 419, 420).

57. Bossekop II.

U. O. Årb., 1933−34, p. 80. C. 25466.

The site is a little further towards the southwest, on the same terrace as Bossekop I and with the same conditions. The site was discovered by Nummedal in 1932 and visited again in 1934.

The material collected includes a total of 70 pieces. Mainly dolomitic flint was used, which appears to be very abundant; and for some pieces, quartz and various quartzites were used.

Implements. — The half-dozen cores that were found were all made of flint. One of them is a bladed core, 0.09m long, undoubtedly the largest of the Finnmark flint cores (pl. XCV, fig. 421). There are also smaller discoid pieces, of more or less regular shape (pl. XCV, fig. 422), sometimes reused as scrapers as usual. On this subject, let us mention the tool in fig. 423 (pl. XCV) which originally was certainly a disk, and which is now reduced to the state of a thin plate with a two-sided cut. Its entire perimeter is worked on both sides, alternately, which produced many small concave and convex scrapers, not to mention a beak or spur, between two alternately retouched notches.

There are not many fragments of knapping. We show (XCV, fig. 424) only one. It is an elongated flake of gray quartzite, 0.182m in length, brought on the upper side along both edges, while the tip is intentionally recut on the fracture plane; the result is a sort of tool of sharp percussion. The striking surface and the bulb are no longer visible, but they were probably on the edge of the point.

There are quite a few blades. The quality is uneven, most often poor. Many bear traces of use on the edges, sometimes in the form of notches, with or without retouching (fig. 37c).

The site is also characterized by medium or small-sized tools. There are about a dozen scrapers. Some are small and shaped like blades at the end (fig. 37b). Here too, there is one of these tools that we find in Steinseng and Tollevik; a short and wide blade, with retouching of the lower face into a burin or scraper ("sinew frayer"). On this piece, shown in fig. 425 (pl. XCV), the percussion bulb has also disappeared. We also have a narrow hulled scraper, very thick, quite similar

to those of other sites, which we prefer to call busque burins (pl. XCVI, fig. 426).

The burins are also represented by some certain examples, with others being doubtful. Fig. 427 (pl. XCVI) presents a corner burin whose truncation is slightly retouched. In fig. 428 (pl. XCVI), we see a double burin, one of the bevels of which comes from two crossed burin strokes, and the other from a burin stroke completed by concave retouches. In addition, this piece has a beak on one of its edges.

Microlithic tools are not abundant; these are, with the two small scrapers on blades that we have cited, three arrowheads (pl. XCVI, fig. 429, 430), one of which, at least, has abrupt dorsal retouches (fig. 429).

58. Tollevik.

U. O. Årb., 1931−32, p. 232, No. 95. C. 25174, and A. NUMMEDAL: Stone Age Finds, p. 16.

This site was discovered by Nummedal in 1925. It is located a short distance northeast of Bossekop I, on a small terrace, at the base of the slope, closer to the mountain Komsa. The Elevation according to Mr. Marthinussen's calculations: 52 meters. The ground is a cobble beach and the objects were mainly on the surface, sometimes at a depth of 0.15m to 0.20m. The search covered 27m^2, that is to say that the site was thoroughly explored

The collected material includes several thousand pieces, which, moreover, are largely made up of cut waste and small flakes of any shape, which would be of no interest if many of them did not bear traces of use and a few even a slight accidental retouching. A cobble used as a hammerstone weighs 375 grams.

Raw material. — With the exception of a small discoid block of quartz, only dark dolomitic flint was worked here, which has about the properties of quartzite. From the mass of the cut stones, we think that this rock was extremely abundant. We also do not notice the often laborious economy of flint, which strikes at so many other sites. And if one objects that the largest core of the site is only 0.065m long and that the largest piece cut is a blade of 0.092m, we will respond that these modest dimensions come from the fact that the flint was used here, especially in the form of small cobbles.

Implements. — It is an industry of average pieces: cores, flakes of limited size, blades and bladelets in abundance. There are at least 75 blocks that must be considered as true cores or transformed cores. They are exactly the same as those of the other sites; discoids (pl. XCVI, fig. 431) that are

Fig. 38. Tollevik: block retouched into a scraper at the base and cut into a multifaceted burin at the top (a); corner burin with retouched concave truncation (b). Flint. Natural size.

elongated, prismatic, or sub-rectangular, sometimes very irregular. But the proportion of discoid pieces is lower than elsewhere, and that of elongated blocks higher.

This perhaps comes from the fact that the bladed cores have undergone a little less intense exploitation than usual and that, as a result, we find fragments of cores reduced to the state of thin plates, with a false discoid character. Dimensions range from 0.065m to 0.025m, but the average is 0.04m or 0.05m. A selection of these pieces is shown in Stone Age Finds, pl. VI.

The knapping was carried out starting from prepared striking planes, which, almost all form an acute angle with the plane of fracture of the core. The same remark should be made about blades and splinters. Bladed cores often have this very oblique striking planes at both ends, from which knapping was done alternately (pl. XCVI, fig. 432).

As the facets of the striking surface often give the impression of a rough retouch into a scraper, it is sometimes very difficult to tell if a core is intentionally transformed into a scraper. This is especially the case for very used cores. However, there is no doubt that there are accidental scrapers, scrapers intentionally fitted onto the core and several true core-form scrapers (Stone Age Finds, fig. 34), which are sometimes sharpened by removal of a transverse flake. In one or two cases, we can wonder if we are dealing with a narrow core-form scraper, or if it is rather a thick burin with multiple facets, opposed to an oblique removal (fig. 38a, at the top).

Fig. 39. Tollevik: Wide blade truncated in the fashion of "sinew frayers" (a). Double burin on core fragment (b). Flint. Natural size.

From the nature of the rock, it follows that a coarse industry derived from large flakes cannot exist here.

What characterizes the tools is above all a large quantity of blades and even more bladelets, most of which have chips and sometimes traces of use on the edge, but which are rarely retouched into tools. Then, among the great mass of flakes, some must have been intentionally cut and transformed into tools. However, the number of characteristic tools is not very high. In addition to a few piercers and burins of a fortuitous nature, there are scrapers, burins, tanged tools (points) and some retouched blades.

Scrapers. — A single thick flake is cut in such a way that one preferably sees a scraper there. A few flakes of any shape provided small, thick scrapers, by fine retouching in contact with a transverse and concave removal (pl. XCVI, fig. 433, top). The other thick scrapers are, as we have said, derived from cores. The thinner and lighter scrapers come from accidentally shaped flakes. The retouching is often so rough or so light that it is difficult to notice it. Better pieces (fig. 38a, bottom and pl. XCVII, fig. 434; Stone Age Finds, fig. 29) are almost the exception.

There are no beautiful scrapers on blades, except for two microliths (fig. 40b and c). On the other hand, this site has some short and wide blades, with retouching on the striking surface − and, where necessary, corresponding modification of the opposite side −, which we compare to "sinew frayers". The piece in fig. 29, in Stone Age Finds, which also presents lateral retouches, has undergone a vigorous scraper modification at the bottom, on the lower surface. In fig. 39a, we see one of these scrapers with retouch, on the lower face, on both ends.

Burins. — At this site there are a large number of burins from flakes or coarse blades with sharp angles, following removals. In most cases, removal is carried out perpendicular to an unretouched fracture or a thick edge, and the pieces are then very uncharacteristic. In the vast majority, they are certainly fortuitous, sometimes they are only

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Fig. 40. Tollevik: microlitic tools: tanged arrowhead (a); short truncated blades (scrapers) (b−e): fragments of knapped bladelets (d−e), bladelets retouched at the point (f−h). Flint. Natural size.

false burins; but a minority is probable and even certain. We show a selection (pl. XCVII, fig. 435−439, and fig. 38b, fig. 39b).

In fig. 435, the piece is obtained by oblique burin cutting on a fracture; in fig. 436, by two crossed burin strokes; fig. 437 is almost a parrot's beak; in fig. 438, the burin was carried on a thick oblique truncation, modified; in fig. 39 b, on a better retouched oblique truncation, which however can be the result of the preparation of the striking plane by facets. The piece in fig. 439 is derived from a bit of core, with two removals at the corner of a thick retouched truncation; the burin of fig. 38b (Stone Age Finds: fig. 45) is obtained by several facets of cuts at the corner of a retouched concave truncation. There are also some microlithic burins (pl. XCVII, fig. 444, and fig. 40g, h).

Retouched blades. — While it is common for blades and bladelets to have usual chips on the edges, on the other hand, it is very rare that they are intentionally retouched into tools. Two broken blades have irregular marginal retouches, of the "Aurignacian" type (Stone Age Finds, fig. 50, a and c); but as these two pieces were very rolled, we can fear that the retouching is due, at least in part, to mechanical causes.

Finally, we have two knife-blades, with dorsal blunting near the point (p. XCVII, fig. 440 and 441); one of them seems to have been adapted into a burin.

Tanged tools.— Four medium-sized tools are roughly tangs. One is a good blade that has at the tip many fine

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removals, however too weak to form a scraper. The others are flakes of accidental shape, all with small chips from use at the tip or on the edges (Stone Age Finds: figs. 47 and 48).

Microlithic tools.— They are much more numerous than usual. Note more than twenty ordinary arrowheads, derived from lamellae, with tang (pl. XCVII, fig. 442−443). These pieces are quite large; but there are also very small ones, sometimes with a fine retouch of the edge (fig. 40 a). Curiously, we do not find here an arrowhead with a unilateral edge and abrupt dorsal retouch.

On the other hand, there is a limited number of strips to which are given, by a fine rough retouch, the shape of other microlithic tools. Let us mention some small bladelets with dorsal blunting near the tip; small scrapers (?), four of which are short strips, which have kept the bulb of percussion and an oblique truncation at the opposite end, which gives these pieces a false trapezoid appearance (fig. 40 b, c) ; bladelets or small flakes with finely retouched notches (fig. 40d, e); some real burins (pl. XCVII, fig. 444); finally three burin-shaped points (fig. 40 f−h), the first of which is double, with a curious flat retouch at one end, which suggests an emerging Solutrean retouch.

59. Steinseng I and II.

I. U. O. Årb., 1931−32, p. 231, No. 90. C. 23931 and A. NUMMEDAL: Stone Age Finds, p. 10.
II. A. NUMMEDAL: Stone Age Finds, p. 17.

The Steinseng I site was discovered in 1925 and the antiquities collected were studied by Nummedal in the cited work. Later, he visited the site twice, in 1931 and in 1934. Each time he carried out fruitful excavations, bringing back, in 1931, 259 pieces, and even more in 1934. The original figure is therefore more than double. This site, which can be considered to have been thoroughly explored since 1934, is one of the richest and best known in Finnmark.

The site is located in the countryside, just above the Steinseng farm, northeast of the mountain Komsa. Elevation: 54 meters. A valley, bordered by two mountain peaks, rises through a meager pine wood to a terrace, which, further on, transforms into marshland. Located at the very edge of the terrace, the site is exposed to the wind, except towards the west (see pl. VI). The ground is a beach of fairly coarse cobbles, rolled up by the sea between the two rock groups. The objects were found here on the surface, under a thin touch of brier soil, sometimes also at a shallow depth.

The raw material is mainly dark colored dolomitic flint, and an excellent white quartz. Some quartzites and a little greenish diabase were also used, as in the vicinity of Kirkenes. The origin of these rocks is less certain: probably cobbles taken on site or in the neighborhood were used more than once

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but it should be noted that here, unlike the other sites, few pieces have retained traces of the polished surface of the original cobble. It is not therefore not impossible that at this site, there was direct extraction of the rocks in question and in particular the flint.

Regardless, flint was quite abundant. The prehistoric people left, for example, a plate of excellent flint, used as a core and measuring 0.21m in length (pl. XCVIII, fig. 445), which, at other sites, would undoubtedly have been used down to the last strip. Visibly, the worker, held the plate in his hand by its point, placing the shortest side on the anvil. Then, with blows on the other lateral face, he extracted coarse transverse blades and a few fine strips. We can see the trace of these knappings in the figure.

Implements. — We have nearly a hundred pieces that must be characterized as true core, core-form blocks, or reused cores. Again, we note that the cores are extremely small compared to the flakes and blades of the site. The quartz cores are, as usual, a little larger; those of flint smaller, although they are not as small as elsewhere. Some, in both groups, are sometimes only 0.02 in length. The reason is undoubtedly that here again the knapping of bladelets and small flakes was carried out as far as possible. Then, the core was often used as a tool, after suitable modification. Consequently, the shape of the core-form pieces is more or less irregular, or even accidental. However, we can distinguish characteristic shapes: discoid, elongated, and − especially for quartz blocks − almost spherical.

Discoid pieces are by far the most numerous. Some could belong to a Mousterian culture (fig. 41) and a large number of cores have retained, to varying degrees, their discoid character (pl. XCVIII, fig. 446 to 448). More rare are the conical or sub-rectangular cores, which were intended to provide blades (pl.XCVIII, fig. 449); but we also find some as wedge-shaped flakes, and with faceted edges, which must come from the sharpening of these cores or from core-form scrapers (see figs. 15k and 22d in the text).

The striking planes of the cores − whatever their shape − can be faceted or plain, which is also the case of the striking planes of the flakes and blades. The thing is negligible. On the other hand, it should be noted that the striking planes, almost without exception, form an acute angle, sometimes even very acute, with the bursting planes. This is important for reusing cores, and in some cases for reusing blades and flakes.

On widely used cores, we often see, due to the fact that the striking plane is oblique, one or more cutting edges, shaped like hatchets, being produced. However, typical tools of this kind are quite rare here.

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Fig. 41. Steinseng: Discoid tool ("throwing stone"). Quartz. Natural size.

On the other hand, we note the presence of a fairly large number of instruments that come from a more advanced flake −, on the two faces of thin core and almost like plates −, or relatively thick fragments. Fig. 450 (pl. XCVIII) shows a piece of slightly altered diabase with sharp edges completely cut on both sides. In terms of form, it resembles both the punches and certain axes from the post-Campignian period in the south of the Scandinavian peninsula. In fig. 451 (pl. XCIX), we see a flint − also with a biface cut −, very thinned at the edge and which, moreover, has sharp notches coming from oblique blows higher up on the edges,. Other similar pieces are thin, almost plate-shaped; others are thicker, more core-formed. The purpose of

these tools is unclear. A few were suitable as both scraping and blunt tools.

The faceted striking surface of used cores can automatically have the appearance of a scraper, perfectly usable as such. Without a doubt, such tools were sometimes completed by an appropriate retouch, often involving the lower face (fracture plane) of the scraper. Thus, we certainly have core scrapers of fortuitous origin, and others that come from intentional modification, without it being possible to specify in each case. A significant percentage of the blocks appear to have been used or made into thick scrapers, for example the pieces in figs. 446 to 448. Several others have the short retouch that characterizes the typical core-form scraper (pl. XCIX, fig. 452). Very often this retouch is observed on quartz cores, even on those that have a globular shape, and always, in this case too, on the flat surface that is the lower face of the scraper.

As we said above, the vast majority of flakes of the site come not from cores as we find them, but as they were at an earlier stage of their use. This, however, is not as true of blades. There are a lot of them of guartz, and even more of flint, almost all of poor quality and of medium or small size, and that sometimes correspond exactly to those of the cores that we possess.

Flakes also naturally occur in groups, but most are the waste of knapping. There are few that by their dimensions and their character can be compared to the beautiful and large flakes of knapping from the

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Fig. 42. Steinseng: blade with notches, small corner burin, small transverse burin, blade with blunted back, retouched blade segment. Flint (b–c), quartzite and quartz. Natural size.

classic sites. We show a fragment, very rolled or worn by water. It is based on a large flake or wide quartzite blade that originally had a striking surface with coarse facets of the type of Levallois flakes (pl. XCIX, fig. 453). But similar pieces that approach this are rare at this site, and naturally there are none made of flint.

On the other hand, it is very common here that large, medium, or small flakes, are also retouched on the lower side, because one wanted to make them immediately usable with a very simple modification. Some thus took the form of a piercer (pl. XCIX, fig. 454). Most often this adaptation is limited to one or more crude removals, by a blow made obliquely on a suitable edge; this results in cutting or scratching parts that often are very concave (pl. XCIX, fig. 455). But alongside these tools or makeshift tools, we also find characteristic instruments, shaped on large or medium flakes. They are cutting or scraping tools.

Scrapers. — At least a dozen pieces can be characterized as real scrapers shaped on the edge of medium-sized flakes, mainly of quartz. A good example is shown in fig. 456 (pl. XCIX). Another, less typical in shape, can be seen in fig. 457 (pl. C). They have on one edge, opposite the scraper, one of the notches mentioned. Others are sometimes very modest in size. We also have a double scraper of the thick type with a rhomboidal cut and alternating size on both sides, which we also found at other sites (e.g. at Smellroren).

Sharp tools. — Several flakes have sharp, burin-shaped parts, due to cutting or modification, or even formed by the naturally sharp edge of the flake; sometimes this edge is isolated by notches

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grinding or retouching. But there are also a small number of tools resembling slicers, obtained from a flake or from a blade by a fracture or by transverse retouching. Two sub-rectangular pieces have a double sharp edge (pl. C, fig. 458), which is also observed at other sites. Fig. 459 (pl. C) shows a triple-edged piece; it is undoubtedly shaped like a scraper on the striking surface. These are small tools that we can call atypical sharp edges. But we also have a fairly large triangular flake of dolomite, whose edges are constituted by unretouched fractures and which shows a sinuous edge due to the size of the upper face (perhaps a preparation from the block), and has a slight adaptation of the cutting edge to the lower face.

What is striking, on a first examination of all the finds, is naturally this crude industry. But the number of these relatively large and heavy instruments is in reality insignificant. What characterizes this site after careful sorting is a rich industry of small tools, derived from small flakes and blades, or, as we have already mentioned, small core-form blocks. It is not possible here to establish a distinction between tools made from flakes and those made from blades, and this is of no interest. The shapes we mainly deal with are scrapers, burins and different kinds of points and retouched blades.

Scrapers.— They are extremely numerous. Besides core-form tools already mentioned, there are a few other thick scrapers, in particular some almost typical keeled scrapers (pl. C, fig. 460). A sort of keel scraper can also be seen in fig. 461 (pl. C); it also has intentional transverse notches on the back. A sort of muzzle scraper is shown in fig. 462 (pl. C); it is derived from an irregular core with a large oblique projection on the lower surface. An interesting example of the transformation of the core into a scraper is shown in fig. 463 (pl. C); this piece has an oblique faceted striking surface at its widest part (at the top of fig. a). It is this part that forms a scraper, with modification on the lower face, of the original fracture plane (at the top of fig. b).

In addition, we observe, on the edge of a large concave removal (to the left of fig. a), a rough retouch (to the right of fig. b) that forms another thick scraper; finally the wider end ends in a narrow scraper. This wide convex scraper is not an exception. There are also some other thick fan-shaped scrapers, for the most part with modification of the lower surface (pl. CI, fig. 464).

Simple scrapers on the ends of blades are rare, like elongate scrapers, forms on the edges of blades or flakes. Fig. 465 (pl. CI) offers a small example of both cases. Fig. 466 (pl. CI) shows a very rolled blade, the tip of which is retouched to a scraper on the lower side.

A frequent form at this site, is that of fairly wide blades or elongated flakes, made with a retouching of the striking surface on the edge of the lower face, often

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with modification of the opposite face, in the form of longitudinal removals (roughly the same as bladelet cutting). Figs. 467 to 469 (pl. CI) show some of these pieces; those of figs. 467 and 468 have retouches at both ends. These tools have a lot of resemblance to the sinew frayers of Mr. Leakey, but it is questionable whether they are scrapers, or whether some of them at least, could have been scissors (Cf. pl. XCV, fig. 425, and fig. 39a from Bossekop II and Tollevik).

Simple flakes often also provided scrapers by retouching the striking surface. This retouching happens by itself, so to speak; the knapping of the core with an oblique and faceted striking plane, which is common, then only requires a slight modification. These pieces can also be fortuitous, but not those where the plane of fracture and the bulb of percussion are affected by retouching, which is the most general case.

A very interesting tool is that of fig. 470 (pl. CII): it is a wide blade, recut all along the spine, with fine retouching near the tip and at the tip itself. It combines a convex scraper and a concave scraper, and also has a retouched beak, between two concave parts. The opposite edge is a cutting edge, separated from the retouched part by a narrow burin that seems intentional (Cf. pl. LXXXV, fig. 364, and fig. 30f). There are also some other smaller blades, with protrusions similar to the shape of a beak, limited by retouches or notches. A beautiful combination is offered by the object in fig. 471 (pl. II), a broad and thin blade of quartz with chips on the cutting edge, and, on the other, a retouch on the lower face forming a rectilinear scraper; at the same time, by a concave retouch from the end, near the bulb of percussion, it is arranged as an angle burin.

The vast majority of scrapers from Steinseng, as at almost all sites, are made up of accidental pieces: small and medium-sized flakes of any shape, mostly retouched in a very rough manner, very crude too, because of the nature of the rock. One of the best − actually the remains of one core − is shown in fig. 472 (pl. CII). On others, the useful part is only slightly convex or even rectilinear. Retouching is often carried out on the lower side. Quite a few flakes and some blades have notches on the edges. The notch rarely shows a good retouch (fig. 42a). In general, it is produced by a chip or by a blow perpendicular to the edge of a thin flake, or even obliquely at the edge of a thick flake (pl. XCIX, figs. 455 and 456). All dimensions are represented.

Burins. — A large number of flakes have diagonal angles, as after a removal by burin. Many are made of quartz or friable quartzite, without retouching. These parts offer no guarantee and are certainly partly accidental. However, even retaining only the pieces of siliceous rock, there are more than 40 that are almost certainly burins. At first

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sight, they are not easy to discern, because they are rarely derived from good blades, but rather any flakes; they therefore seem atypical.

Almost all are variations of the angle burin. Many result from a single blow given perpendicular to a fracture and parallel to the edge of the flake or blade. We thus obtain a sort of burin on a broken blade, more or less typical, perhaps accidental in certain cases. A similar piece, shown in Stone Age Finds, fig. 19, has a bevel, perhaps two, obtained in this way, and in addition a pointed burin on the end of the blade, with a well-retouched concave truncation on the side of the fracture plane. This tool is better seen here, in fig. 473 (pl. CII), which shows the other side. The same manufacturing process is sometimes used on thicker, semi-core-form pieces, but then with two or more removals that more or less invade both sides of the piece (pl. CII, fig. 474). Some short but wide and quite thick specimens are formed by the meeting of an oblique retouch and a thick edge or a burin removal (fig. 42 b). An exceptional piece is a busque burin (pl. CII, fig. 475); but exactly the same tools are found at Smellroren and other sites in Finnmark. A transverse burin with multiple facets on a thick flake (fig. 42 c) is also similar to the busque burins. Some others, shaped on blades or on narrow cores, are cut with facets at the meeting point of a removal (pl. CIII, fig. 476), or of an oblique and wide edge (pl. CIII, fig. 477) like polyhedral burins. A combination like that in fig. 471 is rare.

We also collected some pieces cut during the manufacture of burins. One of them is shown in fig. 478 (pl. CIII).

Retouched blades.—The numerous blades available to us are very short and mostly of poor quality, as mentioned. Many have signs of use on the edges, but relatively few were used as tools. Only a few have marginal retouches, reverse or not, of the Aurignacian type (pl. CIII, fig. 479 and Stone Age Finds, fig. 20). Similarly, we find some small blades with dorsal blunting, either towards the tip or all along the back (pl. CIII, fig. 480−482, and fig. 42d). Only a large enough piece was modified for fitting (Stone Age Finds, fig. 22). It also has alternating retouches along the spine and, on the edges, usual chips (like a knife?).

Points. — Here, there are few of the medium and small triangular flakes that we found in abundance at some sites and which sometimes are slightly pointed at the edges. We also do not find any retouched flakes reminiscent of Mousterian-type points. A thick flake of quartz, biface cut, (pl. CIII, fig. 483) offers a superficial resemblance to this type of instrument. Although the pointed end was undoubtedly adapted for striking, yet the retouching, over a large part of the circumference, intended the piece to be a

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very rough scraping tool. On one edge, it also has a burin or a sort of cutting edge with two notches. A single point is derived from an irregular, but fairly flat flake. It nearly has the shape of the cordiform arrowheads of the northern Eneolithic.

On the other hand, we also find here in quantity, small points with retouches along a convex back, which resemble those of Abri-Audi. Nearly thirty are made of flint and quartz and we show a selection of them (pl. CIII, fig. 484, and pl. CIV, fig. 485 to 488). Their length varies from 0.06m to 0.03m. Very rarely, dorsal retouching is performed on the lower surface; similarly, we only have one example of an edge sharpened by retouching. (fig. 487). Note that many of these points show traces of use.

Tanged tips. —The number exceeds two dozen. There we find, as usual, microlithic arrowheads with a unilateral edge, with tang and abrupt blunting along the back (7 pieces); see fig. 489 and 490 (pl. CIV), and Stone Age Finds, fig. 24. 17 are simple small leafy pieces, the blade of which is unmodified or slightly modified (pl. CIV, fig. 491−492, and Stone Age Finds, fig. 24). The retouching of the tang alternates on both sides, or is only carried out on the lower side, as seen in figs. 491 and 492.

Two points are of a particular type: the leafy part, triangular, is wide and quite short, the tang is located in the axis of the piece. The best is reproduced in fig. 493 (pl. CIV). The marginal retouch excludes any doubt about the type of this piece, of which we find the exact equivalent in the civilization of Ahrensburg-Lyngby.

A unique case is that of fig. 494 (pl. CIV): it is a dark quartzite point, 0.061m in length, with a well-retouched tang, almost in the extension of one of the edges of the piece. This very edge presents a good retouch that goes without interruption from the tip to the tang, which makes us think that the shape of the piece was well intended. As far as we know, it is unique in Scandinavia, but it is similar to Lyngby points and primitive screen points of a late Aurignacian period.

The microlithic tools are limited to the small tanged points that we have just spoken about and to a few bladelets with turned backs, of which we have also given some examples above. Finally, let us cite a small fragment of a blade, the shape of which recalls the transverse-edged arrowheads of the Campignian. However, the piece is finely retouched at the place where the cutting edge should have been (fig. 42e).

The Steinseng II site is located immediately to the west of Steinseng I and similarly located at the very edge of the terrace, between two rock formations only 6 to 8 meters apart. The ground is formed by a layer of cobbles, sometimes very thin.

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Some diggings have brought to light very little material of flint or dark quartzite. It mainly includes waste of knapping. The tools are not very characteristic; they consist of a few small, extremely used cores and small, very crudely shaped scrapers on flakes; one of them bears a long retouch on the striking surface (Stone Age Finds, fig. 25). It also has, like many other pieces at the site, usual chips on the edges. Some flakes with sharp angles imitate, certainly fortuitously, the shape of the burin.

60. Amtmannsneset.

A. NUMMEDAL: Stone Age Finds, p. 19.

The place is located north of Steinseng, towards a salient of the mountain Komsa. We limited ourselves to a few surveys that yielded only meager and mediocre material of dark flint. With the exception of a sub-rectangular core, a blade and some small fragments of knapping, these are only waste.

61. Isnestofta.

U. O. Årb., 1933−34, p. 83. C. 25470.

Traces of sites were discovered here in three places: on a terrace at an elevation of about 20 meters (I); in land that was being dug for the school house, elevation: 23m (II); finally, a little to the east, on a sandy patch, at an elevation of 43 meters (III). In the first place, the Tapes shoreline is at 22.50m according to Mr. Marthinussen's leveling, and the late glacial shoreline is at 54 meters.

At the first site (I), we found objects from the Recent Neolithic, which agrees with the position of this site.

From the second site (II), 26 pieces were brought back, most of them of dolomitic flint, only a few of quartzite. Some cores have an irregular shape; the scrapers are atypical and the blades poor. The rest consists of small fragments of any shape, without trace of modification. Overall there are no characteristic features.

The third site (III) provided a total of 70 pieces. The employed rock is mainly dark dolomitic flint; in addition, a little quartz, quartzite and a very altered diabase.

The tools are poor and uncharacteristic. In addition to two medium-sized cores, of flint and diabase, we find a few small irregular blocks. Some flakes are triangular, but only one shows a very rough modification (chipping), in the shape of a point. There are also, like almost everywhere, some scrapers of accidental shape. The only truly characteristic tool is a good arrowhead, of rhomboidal shape, made by a double oblique truncation (pl. CIV, fig. 495).

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GENERAL CHARACTER OF THE FINNMARKIAN

The sites. Notes on knapping technique. The tools. Conclusions.

1. The sites.

In the preceding chapter we reviewed all the sites and their inventory, examining in detail the richest and most fully explored, such as give the most complete idea of the Finnmarkian civilization in the different regions. These are the Seilmerket II, Smellroren, Storbukta and Steinseng sites. However, it will be useful now to summarize what we have learned about the character of these sites, the knapping technique in use, and the main forms of tools.

The result of research carried out over ten summers is that we know sixty-one sites in Finnmark where the Finnmarkian is represented in greater or lesser abundance. As shown on the general map (Fig. 1), these sites extend across the region known as Eastern Finnmark, about from 23° to 31° east longitude (Greenwich). The sites located furthest south are at 69° 40' north latitude, and the most northerly at more than 71°. Mr. Nummedal also often covered large areas of western Finnmark and the province of Troms. Although, in these regions the recent Neolithic (Shale civilization) is also well represented, it was not possible to discover traces of the civilization we study here. In a single place, Sørøya (near the sea, north of sites Nos. 50 to 61) two minor sites were found during the summer of 1935.[1] It therefore seems, for the moment, that this civilization is limited to the region which goes about from the mouth of Altafjord to the border of Finland in the east. However, this may not be correct. Such a limitation does not

[1] These discoveries were made when we had completed our study of the material and we were therefore not able to report them. But, with the exception of their location in the west, they offer nothing new. The equipment is very limited; it has the same character as in the east, with corresponding tool shapes, and the same kinds of rocks. Their elevation is about 20 meters, and the corresponding Tapes shoreline is about 10 meters.

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respond to natural conditions, and we should expect to see sites appear both further west − and perhaps even down south, along the coast of Nordland −, further towards the east in the north of Finland where it has been known for a long time that two related sites exist[1], and probably even along the Russian coast on the Polar Sea. Above all, in the future, we must think about the Kola peninsula and more generally the White Sea region.

But even if we stick to the part of the Arctic coast where this civilization is represented, the sites discovered so far can hardly give a complete idea of it. Without a doubt, the number of sites could be considerably increased, even in eastern Finnmark. The immense expanse of this country, the extreme dispersion of the population, with the resulting transport and housing difficulties, not to mention the brevity of the summer, require increased searches for very narrow limits. This is why the distribution of sites in groups, clearly visible on the map, is certainly accidental. They are grouped around the places that it was natural to choose as bases for field research. Added to this is the fact that not all the sites could be explored

thoroughly, far from it. Many of them could undoubtedly provide more material, and for some, the exploration must be considered provisional.

However, admitting for certain that we are far from having discovered all sites, even in eastern Finnmark, it must be recognized that their considerable content is already enough to allow us to draw more than preliminary conclusions. We have reason to believe that the antiquities collected can give us this civilization's character, its content, and its extension, an overall view that will not change significantly in the future, even if new discoveries bring, as we must hope, more insight into questions of origin and date in particular.

Concerning the character of the sites, it must be noted immediately that all, without exception, are outdoor sites where the prehistoric people were out in the open or in tents or light huts. That shelters, temporary or transportable, have been used, is more than likely, when we think that the climate must at times have been very harsh. In many places also, the antiquities are closely grouped, gathered over an area of a few square meters, which could very well agree with the existence of huts or tents, like the Lappish tents, for example. But we have not found any trace of dwellings of this kind, nor of the holes or underground shelters that we know from the Russian or Siberian Paleolithic. True shelters are unknown in Finnmarkian, despite the research that has been undertaken.

[1] TANNER: Studier over kvartärsystemet i Fennoseandias nordliga delar (Studies of the Quaternary system in the northern parts of Fenno-Scandinavia) p. 464. Bulletin de la Commission géolog. de Finlande, No. 88. Helsingfors 1930.

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Always, the antiquities are found on the surface of the glacial or moraine deposits that cover the older formations. Often they are bare, sometimes hidden by the thin patch of topsoil that formed on the coast of Finnmark. Rarely, if not never, they have been discovered at a depth exceeding 0.20m, but it must be added that soundings have often had to be challenged. In no site was a real stratigraphy observed.

The sites and the archaeological pieces are therefore never protected from atmospheric influences, rain, snow, or frost. The result is that all organic matter has disappeared. No vestige of fauna remains, nor the tools made of antler, bone or even wood that must have been used. At some sites, small pieces of charcoal were found, which does not necessarily mean that there were forests or shrubs in the neighborhood of the sites. Besides, this charcoal can be of later date, and due, for example, to a forest fire during a more recent and milder period. It can also have as its origin the floating wood, which always in historical times has played a role in the economy of Finnmark (p. 250), and that Stone Age people may have collected along the coast.

The tools that are preserved at these sites are therefore only made of stone. The raw material varies greatly from one place to another. On the border (Grensen) and in the Kirkenes region, quartzite is used, quite often quartz, diabase, hornstone, and very rarely flint; from Nesseby to Vadsø, are the same kinds of rocks, almost, but no diabase and little quartz and hornstone. Along the rest of the coast, in the Varanger Peninsula, from Kiberg to Berlevåg, red-brown quartzite is the basis of the industry, rarely hornstone and flint. From Valan and the Porsanger sites near the sea, up to and including Børselvneset, the rock used is a greenish gray or brown gray quartzite of poor quality. In the three sites of Kolvik, located just opposite Børselv, dolomites and dolomitic flint appear, to which is sometimes added a grayish quartzite. At Alta, dolomitic flint was mainly used with a little quartz.

On the subject of the varieties of rocks used at the sites and their deposits, Mr. Halvor Rosendahl, curator at the Paleontological Museum of the University, has kindly written the overview that we are going to read.

Rocks used in the Stone Age in Finnmark.

A rock may be suitable for the tool industry if it is sufficiently homogeneous and isotropic, fine and tight grained, not porous, both hard and consistent, and not friable. In reviewing the rocks used in Stone Age Finnmark, we will indicate both their properties and their deposits.

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The following diagram of the succession of the geological formations of Finnmark will make it easier for the reader to orient themselves.

Cambrian system (and Eocambrian) of Finnmark.

Upper group

Shales with middle Cambrian fossils

Quartzites, including brick-red quartzite

Shales
Moraine conglomerates with flint.
Lower Group
Dolomitic flint
Shales
Quartzites, including a violet-brown quartzite
Precambrian
Gabbro, granite, amphibolite, gneiss, etc.

The following types of rocks can be distinguished:
A. Dolomitic flint from the Cambrian of Finnmark.
B. Quartzites from the Cambrian of Finnmark.
C. Quartzitic rocks of varied nature, including rock crystal.
D. Cornéenne. Flint corné (German Hornstone, English hornstone).
E. Diabase.

A. — Dolomitic flint is a true flint, resulting from the formation of concretions of silica in a limestone rock. Compared to chalk flint, its grain is a little coarser, since its crystalline elements often measure from 0.02mm to 0.04mm, while in chalk flint their dimension is less than 0.01mm most of the time. However, this somewhat coarse structure hardly diminishes its industrial value. On the other hand, it is difficult to find flawless clumps in the dolomitic flint of Finnmark as large as in the chalk flint. In its pure state, it is most often dark, black or dark brown, more or less translucent. When it contains dolomite, it is lighter and more opaque. Dolomitic flint can also be oolitic.

Geological origin: flint is found in Finnmark in two types of deposits.

1st in primary position, as concretions in the dolomites of the lower Cambrian Finnmarkian group, at Alta and in a region inside Porsangerfjord, which extends as far as Tana;

2nd in secondary position, like cobbles in moraine conglomerates of the higher group. There was a concentration of flint that forms the hardest and most resistant part of the conglomerate. The best known places are in Alta and in a region inside Varangerfjord and Tanafjord, from the Vestre Jakobselv river to Vestertana, and even in places like Nesseby and Mortensnes, down to the sea. Often, the conglomerate is cracked

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and disintegrates until the cobbles are freed. This is probably in most cases the origin of the flint used in Finnmark.

Furthermore, flint can occur in loose Quaternary sediments, especially at Alta and in the interior of Varangerfjord and Tanafjord, but also throughout the region extending to the end of Porsangerfjord. It can also be found in areas affected by ice, especially in Altafjord, in the entire northern part of Varangerfjord; north of Tanafjord, and further to the northern coast of the Varanger Peninsula, from Tanafjord to Syltefjord.

B. — Quartzite. There are different kinds in the various rock formations of Finnmark. For the lithic industry, a brick-red quartzite was used, especially along the northern coast of the Varanger Peninsula. Tight and homogeneous in grain, it is, from a mechanical point of view, an isotropic quartzite of sedimentary origin, composed almost entirely of tight and angular grains, to which a few grains of feldspar and a little reddish iron oxide are mixed together. The grain size is, for fine varieties from 0.05 to 0.1mm, and for coarser varieties from 0.1mm to 0.3mm.

In primary position, it belongs to the upper Cambrian group of Finnmark; it is found there, forming a thick layer of 150m on the Varanger Peninsula, south of Genjejavre and Ordojavre, and west of Vestre Jakobselv; but it does not reach as far as Varangerfjord. Towards the west, it is known as far as Vestertana.

In Quaternary sediments, quartzite can be found outside the previous region, in places affected by ice, that is to say, along the northern coast between Tanafjord and Syltefjord.

Another quartzite, easily recognizable, which is used in a few places, has a dark purple-brown tint, and its properties are very similar to the previous one; however, its grains, which are almost entirely quartz, are rounder and more voluminous, their size varies from 0.1mm to 0.4mm. This grain size can be recognized by the rougher character of the breaks. The purple-brown tint is due to manganese oxide as well as iron oxide. Other quartzites of varying hues have also been used.

Geologically, these quartzites belong to the lower group, which extends over a large part of Finnmark. Purple-brown quartzite is especially very common in Tana.

C. — In most of the deposits, and particularly in Varangerfjord, we find several kinds of quartz rocks, which are not confused with any of those mentioned above. They are often light in color, sometimes

greenish, and can be translucent like porcelain. They generally give the impression of having a clastic origin. It happens that they are so transformed that, seen with the naked eye, they resemble chalcedony or flint. As an example, we will cite four samples examined under the microscope.

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1st. Place of origin: Nesseby.

Macroscopic appearance: clear, slightly greenish, translucent, with breakage like a coarse-grained quartzite. Mostly completely isotropic, but we can observe the beginning of a slight orientation. It is cut by lighter veins of quartz, that show that the rock was laminated, then modified.

Microscopic appearance: quartz rock with a good dark pigment. Consists largely of quartz that is laminated and then modified. Some quartz elements, measuring up to 1mm, and which are not pulverized, are cracked and show optical signs of mechanical pressure.

2nd. Place of origin: Skytterhuset (west of the shooting barracks), Vadsø.

Macroscopic appearance: like the previous sample, but without quartz veins.

Microscopic appearance: quartzite with pure clastic structure (sedimentary structure), without lamination. Grain size: 0.1mm to 0.2mm.

3rd. Place of origin: Melkevarden, Vadsø.

Macroscopic appearance: neutral tint; looks like chalcedony. Irregular planes of cleavage.

Microscopic appearance: quartz rock without impurities. Large grains of quartz, measuring up to 1mm, with parallel longitudinal orientation; structure and optical characteristics show that the rock has been exposed to mechanical pressure. Mixed with these grains, a dust of quartz grains measuring from 0,01mm to 0.02mm.

4th. Place of origin: West of Berlevåg.

Macroscopic appearance: white quartz rock, semi-translucent, with regular cleavage planes, but not interconnected.

Microscopic appearance: quartz rock without impurities, with angular grains, elongated, oriented parallel, measuring from 0.1mm to 0.4mm forming a compact mass almost without pulverized material. Structure and optical characteristics show that the rock has been exposed to mechanical pressure.

Geological origin: The varieties cited probably all come from sedimentary quartz sandstones, which later underwent mechanical and chemical transformation by lamination and silicification. Those that bear traces of lamination (mortar-structure) must have been exposed to strong mechanical pressure. Their geological origin is probably from the Precambrian region to the south. In Finnmark, they occur only in soft sediments of the Quaternary.

Quartz is actually found everywhere, but since it plays a secondary role, there is no point in focussing on it here.

D. — The rock that we called, and here call horn or horn flint, is found in Stone Age deposits, especially in the area of outer Varangerfjord, for example at Prestestua II, near Kirkenes

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and near Vadsø, but also on the northern coast of the Varanger Peninsula, such as at Berlevåg. In its fresh state, it is a dark bluish green, but it weathers easily and then takes on a dull, whitish gray appearance. Sometimes it also becomes porous as it weathers. Some debris is fresh in the central parts, while others are totally altered.

Macroscopic appearance: in the fresh state, this rock looks like flint; but unlike flint, which is often translucent, it is completely opaque.

In microscopic thin section, it can be quite similar in its structure and mineralogical constitution to pure flint, without dolomitic inclusion. But this is not of great importance, because this structure is not very characteristic. If, for example, we compare horn flint with flake flint (Swedish hälleflinta) which is found in the Fenno-Scandinavian areas, we will notice that it resembles it just as much.

Nothing precise can be said about the geological origin of this rock. On does not find it in place in Finnmark. Presumably, it comes from the Precambrian region south of Varangerfjord. Along this fjord and on the northern shore of the Varanger Peninsula, the prehistoric people undoubtedly found it in the Quaternary sediments.

E. — Diabase. This rock was hardly used it seems, only in the southern part of Varangerfjord. The diabase debris found in and around Kirkenes is in the form of an altered rock, greenish gray, essentially composed of feldspar crystals, 0.3mm long and 0.03mm wide.

Diabase exists in dikes in the Finnmarkian basement; these dikes can also cut across younger rock formations.

From Mr. Rosendahl's explanations and from what we have said above, it is clear, without the slightest doubt, that the men of the Stone Age, in Finnmark, were content with the raw material they had at hand or in the vicinity of the sites. It was obviously not difficult, they did not have the slightest difficulty in finding it. Indeed, the movement of glaciers and the general glacial erosion, the effect of frost and atmospheric actions, detached and continues to detach enormous masses of rock from the mountain, so that everywhere the raw material is in superabundance, although of very unequal quality. The enormous terraces, moraines and beaches that we see everywhere are made up of these countless rolled rocks. We also noted, in our review of the sites, that everywhere one mainly used cobbles found at the site itself or in its vicinity.

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The main reasons that explain the choice made by the prehistoric people of Finnmark of this or that site come down to two: the resources they found to feed themselves, and the abundance of raw materials necessary for tools. According to what we said previously, the second reason plays a small role. However, in certain places, the stay of man or the establishment of sites in a restricted space seem to be caused by the presence of good quality rock. This is the case of Molvika, Ekebergvika and Smellroren. Especially at the latter site, the enormous quantities of knapped stones that cover a vast expanse seem to indicate the presence of a workshop, frequent mainly because good red quartzite was found in the washed moraines and terraces on which the site rests. But the other reason, that is to say the ease of feeding in this or that place, is naturally essential. At the sites, as we have said, we do not have traces of the fauna, no direct proof allows you to say which animals, game or fish, the Finnmarkians mainly searched for and killed. But one thing that jumps out about the sites is their proximity and their dependence on the sea. It is exclusively along the coast that this civilization is represented, and when the sites were established and occupied, it was, with rare exceptions, near the shore or on the shore itself. And we can very well imagine them as close as the tides would allow. Moreover, we have found in several sites rolled pieces which must have been, at certain times, subject to the action of the sea. As a result, this coastal civilization is based mainly on the riches of the sea, which, again today, are the very basis of existence in Finnmark. In some cases, the location of the site is extremely characteristic. Thus Jernbanestasjonen and Messen, in Kirkenes (Nos. 7 and 8), are each located on one of the banks of a narrow and shallow pass which led to the bay that was formed by the sea, the level of which was higher than today, and which would enter Lake Kirkenes. The Alta sites are located on the edge of shallow sand banks, at the mouth of a river where salmon still abound today. In Molvika and at Smellroren, when the sea was high and reached the edge of the sites, it covered banks favorable to fishing. However, we should be careful not to exaggerate the importance of these reasons, because from prehistoric times and even more so than today the sea has grown prodigious quantities of fish, birds and marine animals over almost the entire coast of Finnmark and in the fjords.

But if nature thus offered abundant and easy food at all points of the coast and almost in all seasons, not only could man move more easily by making more or less short stays at the various sites, but also he would feel less obliged to return, on a fixed date, to specific places for seasonal fishing or hunting. Our sites would therefore not necessarily have the character of frequent hunting or fishing places

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for long periods, but only for part of the year, as was also observed in Norway during a later period of the Stone Age.[1] Nummedal, however, does not agree. He even goes so far as to assert that the sites, without exception, have been visited only once, and that, in general, these are only brief stays. And since Nummedal is the only person with in-depth knowledge of the sites, his opinion carries a lot of weight. Moreover, we cannot claim that the composition of the finds contradicts, on the whole, this assertion. Because, without doubt, the material of the important sites shows, as we will see, a wonderful mixture of ancient and recent forms. But it is totally impossible for a site to have been occupied for such a long period that this fact alone could explain this mixture. Climatic changes oppose this hypothesis, as do variations in sea level and other natural conditions.

However, it is quite likely that certain finds testify to prolonged or repeated stays in a site. Here again, we will cite Smellroren. The enormous quantity of cut stones found there cannot result from a brief stay, and, in the present case, as well as in one or two others, we must admit the possibility of fruitful stones or of an extreme abundance of raw material, or of these two reasons combined, which would have brought the Finnmarkians back to the same places.

What extent could the movements of the tribes have taken, we can hardly have an idea of. What we know about other primitive people suppose that they could have been long and frequent. On the other hand, let us

repeat, the conditions of hunting and fishing in Finnmark are such that they make possible a relatively stationary life at least during the summer. Even now, the sea and most of the fjords are free of ice, even during winter. Furthermore, there is a specific circumstance that contradicts the hypothesis of frequent travel from one site to another. It is the presence of this rock exclusively in such a special region. Following a common practice, which we have mentioned, the varieties of rocks used are those offered by the site or its immediate surroundings.

The most instructive example is that of the characteristic reddish quartzite of the Varanger Peninsula. It introduces himself, according to the explanations of Mr. Rosendahl (p. 135), on the seaside, from Vestertana to the interior, between Vardø and Vadsø,

[1] Similar seasonal stays seem, in Norway too, to be linked to shelters at locations that offer protected sites. In Ruskenesset, south of Bergen, remains of fauna show that hunting was practiced there during a short period of the summer. AUG. BRINKMANN and H. SHETELIG: Ruskenesset. En stenalders jagtplass (A Stone Age hunting site). Norske Oldfund II Kristiania 1920. − Skipshelleren, north of Bergen, was a hunting site from the Mesolithic and the Campignian until the Carolingian period. Whether these stays were brief or prolonged, we cannot yet say. JOHS. BØE: Boplassen i Skipsheleren paa Straume i Nordhordland (Skipsheleren site etc.). Bergens Museums skrifter, No. 17. Bergen 1934.

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either in place or transported by ice. However, it was used for knapping precisely in this region, and not outside. If we have not found a single tool from this rock outside its region of origin, it is because exchanges between the various regions have not been very active. One would have thought that this excellent quartzite had been transported as raw material, roughed products or semi-finished products, particularly on the eastern shore of Varangerfjord (Birkenes), where we had to resort to a rock also bad as diabase or as friable as white quartz. And if the Finnmarkians had continued to move from one region to another, we might expect to find tools made from this raw material outside the Varanger Peninsula. But this is not the case, as we have seen. And this is one of the reasons that prove that the population has been relatively stationary, in the places which it usually occupied near the fjord.

On the other hand, it is very possible that the Finnmark sites were summer sites for tribes who returned to other regions for the winter. Given the date of this civilization, which we will discuss later, it is not likely that these winter sites should be sought inland, but further south, along the coast, or towards the east. However, until corresponding sites have been found on these parts of the coast, there is little point in talking about them. There is another possibility: that the Finnmarkians remained on the coast during the summer, then, like the coastal Lapps in more recent times, that they reached the interior of the fjords during the winter, especially to avoid the violence of raging storms on the coast. Thus, the sites on the coast would be summer sites, and a more or less large number of sites on the fjords would be winter sites. This supposition is not absurd, but nothing in the findings seems to confirm it.

Moving now to the study of the main types of tools of the Finnmarkians and the technique they used, we will recall that all organic matter has disappeared from the sites, as well as all tools made of bone, antler and wood. which could exist. All that remains is the stone industry, the poorest and most monotonous of all, and consequently, the one which gives the least advantageous idea of the technical gifts of the populations.

2. Notes on technique (1)

When we want to pass a judgment on the technical capabilities of the Finnmarkians, it is first important to remember that in all the important material that we have collected, not a single piece bears traces of polishing. We have not found, in all the sites, pieces of these polishing wheels, which abound

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both in the more recent sites of Finnmark and further away, towards the south of the peninsula, with the exception, however, of a single sample coming from the base of a hut and probably dating from a later settlement.

Ignorant of polishing, the Finnmarkians also had little use of hammering, which is contemporary with polishing and sometimes accompanies it, on certain instruments towards the south of the Scandinavian peninsula.

The only processes known to the inhabitants of Finnmark were knapping and retouching.

In reviewing the rocks used, we noticed, at each site or nearly, that cobbles found in the moraines and terraces were used as raw material, most often on the very site or very close by. Concerning quartz and quartzite, this appears at first glance, because the knapped pieces often retain remnants of the polished

surface of the cobble. This is the case, not only of blocks and cores, but also half-finished and even finished tools. With the hornstone and the dolomitic flint, it is less easy to realize this, because these kinds of rocks have been used for smaller tools, whose size, finer and more complete, leaves hardly any surfaces intact. However, we found pieces of cobbles of flint that retained the remains of the primitive polished surface. And everything seems to indicate that, for these kinds of rocks too, cobbles were used. In the Varanger Peninsula and to the east of this region, these cobbles are not found not generally "in situ" and it was the glacier that transported them. But even in the dolomitic regions of the West, where the flint is in place, the men of the Stone Age have, without a doubt, searched for the blocks that the alteration or erosion had freed from the conglomerate. And if, on certain occasions, they proceeded by extraction, which is unlikely, they were nonetheless dealing with ball-shaped blocks, similar to small cobbles.

At first glance, there does not seem to be much difference between the Finnmark cobble industry and the old cobble flint industry in Europe and in all countries where flint was used in the form of clumps having more or less the aspect of cobbles. However, there is a very clear difference: the surface of the flint is unusable for tools. In many flint industries, the surface is removed before exploiting the flint.[2] But this already constitutes a

[1] Some observations on the technique and types of tools were collected by A. NUMMEDAL: Noen stenredskaper fra Finnmark (Some stone tools from Finnmark). Universitetets Oldsaksamlings Skrifter II, p. 16. Oslo 1929.
[2] Naturally, flakes or blocks of flint with their surface can also be used for tools if the knapping or retouching removes the surface in the useful part. This is what we see throughout the flint industry and in particular at the ancient stages, in the Clactonian for example, where the use of the block is reminiscent in many respects of the Finnmarkian. See H. BREUIL: Le Clactonien, especially p. 132, Préhistoire, t. I.

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first preparation of the core and then to give it the most convenient shape for the manufacture of the tool, whether it is a core − discoid with fragments, or an elongated core with blades, secondary modification is not needed. It is quite different in the cobble industry, perhaps with the exception of diabase, in Finnmark as elsewhere. The surface of the cobble was and still is fully usable; at the same time, the cobble generally offered one or more surfaces which were suitable as a striking plane, as a starting point for the knapping of blades and elates. If these surfaces were missing, it was easy to create, by a few quick removals, one or more striking surfaces.

In the Finnmark quartzite industry, the raw cobble therefore constitutes the block in the initial and primary state. With a slight modification, reduced to what is strictly necessary, it provides a small number of core tools − bifaces for example (pl. XLIII, fig. 186) − and quite large and heavy scraping, scraping or blunt tools. Then, it is seen that the cobble was first used as a core for the knapping of blades or even flakes. We find a multitude of them, cobbles or blocks, which bear traces of this knapping of blades, or of flakes, or of both at the same time (pl. XIX, fig. 59, pl. XXVIII, fig. 110, pl. LXXIII, p1. XCVIII, fig. 445). Above all, flakes, in large quantities and even of considerable size, made on the upper side of the edges of the polished surface of the cobble. And since it is especially these large pieces that show traces of use, slight modification or retouching, or which are completely adapted into real tools (scrapers, scrapers, points, slices, etc.), it is clear that we are dealing here with real intentional flakes of knapping, and not with waste the size of a core or a tool.

This primary use of the cobble as a core explains that each site presents flakes and blades much larger than could be provided, in its present state, by any of the core pieces found on site. These, in fact, gradually lost their volume following more or less extensive knapping. Let us recall, for example, that at the Smellroren site, one knapped nice blades measuring up to 0.13m in length, while bladed cores are much shorter. At the same site, there are long flakes of nearly 0.20m, and circular flakes up to 0.18m by 0.14,, while the largest piece that can strictly speaking be characterized as a discoid core is only 0.125m long. The very large flakes retain, here as everywhere, remnants of the polished surface of the cobble; visibly, they come from the outside of the cobble or from a part which is very close to it (pl. XLIV, fig. 188, pl. XLV, fig. 189; fig. 27 in the text). And this, despite the nearly unlimited abundance of red quartzite at Smellroren.

But we also found, in enormous quantities, knapped core pieces. Without a doubt, these are, in part, widely used core cobbles; but

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a large number must also be considered as true cores of intentional size. However, as they have been used almost beyond recognition, or adapted into tools such as scrapers or "choppers", the number of truly

characteristic pieces is not very large. However, we find at all the sites a certain quantity of typical discoid cores, the size and use of which are similar to those of the corresponding pieces from the Mousterian.[1]

Discoid cores of hornstone are rarer, which must be attributed to the lack of raw material. There are many made of flint in the flint regions of Alta, but outside this region they are fewer and smaller. Due to the raw material, the discoid cores of flint and hornstone are small (pl. XX, fig. 64, pl. LXXXII, fig. 348, pl. XCII, fig. 399, pl. fig. 431), while those of quartzite and diabase can be quite large, without however reaching the dimensions of the large or largest flakes. The striking surface can be plain − and result from a single large removal − or prepared more or less carefully, which gives flakes and blades with a plain or faceted striking surface. The striking plane forms a more or less oblique angle in relation to the bursting plane (pl. XLI), often even very oblique. There are disk blocks representing all degrees of use: cut but not used (e.g. pl. VII, fig. 2, pl. XLI, fig. 181, pl. LXXXVII, fig. 379); with traces of flake knapping (e.g. pl. LXXVIII, fig. 335, pl. LXXXIII, fig. 353), short blades or blades and flakes (pl. XLI, fig. 182). Often the knapping has gone very far (pl. LXXVIII, fig. 333, 334), so that the cores have the shape of thin pallets, which, in turn, were used as scrapers or other tools (pl. XXXIX, fig. 177, pl. XCV, fig. 423).

The blades can come directly from cobbles or blocks; but we also find a number of bladed cores, especially of flint and hornstone, which have undergone special modification. These are cores showing all ordinary forms of all blade industry, sub-rectangular, prismatic or conical. At least partially, these cores underwent the usual preparation by transverse removals, so that the first blades obtained (edged blades) have an irregular zig-zag edge on the back (pl. X, fig. 16). The striking plane, almost always, forms a more or less oblique angle with the shattering plane (pl. XCVI, fig. 432, pl. XCVIII, fig. 449). Knapping is carried out either starting from a single striking plane, or, very often, starting from two opposing planes (pl. LXXXVII, fig. 380), or even from more numerous planes. From the quality of the raw material and its rarity, it results that these cores are generally small. The largest we have are reproduced here (pl. XI, fig. 20,

[1] Let us refer here to many excellent analytical works by V. COMMONT, for example: L'industrie moustérienne dans la région du Nord de la France. Cinquième Congrès préhistorique de France, Session de Beauvais, 1909. Le Mans 1910.

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pl. XCV, fig. 421; fig. 15a in the text); but the ordinary dimensions are those of figures 432 (pl. XCVI) and 449 (pl. XCVIII), even in the flint regions of Alta. In general, blade cores are widely used, often to the extreme limit (p1. XXXV, fig. 155); sometimes, they took the form of thin plates that could be retouched into a sort of scraper or blades (pl. LXXIX, fig. 336), or even points with retouched backs (pl. XCI, fig. 393). It happens that the core or the core scrapers that come from them are sharpened again by the removal of slices perpendicular to the longitudinal direction of the core, carried out at its base.[1] A certain number of plates must be the result of this process (fig. 15k, fig. 22 d); they are easily recognizable by their fluted edge. Exceptionally, they can be reused and, for example, reworked into scrapers (p1. LXXXV, fig. 362).

A separate group is formed by the blocks of quartz that are found in very large numbers, especially at sites east of Varangerfjord. Originally, they must also have contained cores, or cobbles used as cores for as long as they could, that is to say as long as they presented a suitable plan for knapping. The removals carried out on appropriate parts, all around the core, gradually gave it a rounded, irregular shape, and it lost its primitive character to take on a globular or angular appearance. For the most part, these cores were reused and transformed, through very basic modification, into atypical thick scrapers. We tried to show some of them by drawings (fig. 3 and 16 in the text). As an exception, they may have taken the form, no doubt intentionally, of very thick bifaces (fig. 12; pl. XXIX, fig. 114) or of sorts of atypical scrapers. Elsewhere too, such as in Western Europe and China, where quartz is used for the manufacture of tools, we similarly end up with these rounded block shapes.

Knapping in the quartzite industry in Finnmark is therefore varied and multiple. To begin with, it is not easy to observe; but a more attentive study of the considerable mass of finds allows us to see things more clearly. Let us assume that the starting point for the work was a cobble of suitable dimensions: the knapping was done by blows on a suitable surface, if the cobble had one. However, it is often done starting from a plan of artificial strike resulting, not only from a single knap, but from a large number of small knaps. This is what, in the study of the Paleolithic, we call the "preparation of the strike plan". A single block can thus have two or several striking surfaces, natural or artificial, for knapping flakes or blades. Thus the great flake of Smellroren (pl. XLV, fig. 189) was knapped by

[1] This way of proceeding has been excellently described by the Belgian scientists J. HAMAL-NANDRIN and J. SERVAIS, to whose presentation we refer: Le nucléus et ses différentes transformations. Bull. de la Soc. préhistorique française, 1929, No. 11.

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a blow made on a naturally flat surface of the cobble (bottom and to the right), while the flake that we see, on the reproduction, the negative imprint has been taken previously, starting from a prepared striking plane (top and left); Previously, a blow had been struck on another strike surface (top and right). Here therefore, the knapping took place starting from three different striking planes, although the removals are on the same plane; moreover, of these three striking planes, it is the one that is formed by the natural surface of the cobble that served the last. It is, as has been said, quite common for a single block to present several striking planes. But then, as a general rule, the knapping is done in different directions. Prolonged use often gives these blocks a globular, faceted shape.

What is then very frequently observed is another mode of knapping, which appears more or less clearly in several sites and that we have called "knapping by alternating blows, to the right and to the left, along a sinuous edge". The first stages of this process are most successfully illustrated by an angular Valan cobble that was used as a core. So as shown in fig. 319 (pl. LXXIII), it is a very large cobble, which retains significant remains of the original polished surface. Using a flat surface as a striking plane and as a starting point for flakes, many flakes were knapped along a face that naturally, or by temporary arrangement, formed an appropriate angle with the striking plane. In fig. 319b Nos. 1, 2 and 3 are the breakage plans of the flakes that were produced in this way. But the result was a surface with more or less pronounced facets, that in turn, could have served as a striking plane to produce flakes along the anterior striking plane. This is what was done on the block in question, and we succeeded in finding two large flakes that were thus cut, along the original polished surface (Nos. 4 and 5). In fig. b they are returned to their original positions. Fig. c shows their lower face (flaking plane); in fig. a they were removed and their negative print was found, as well as the small flake (No. 6) that was subsequently removed. The new fracture plane could then serve as a striking plane, that also had more or less numerous facets, and the knapping was done along the old fracture plane, which, in the the meantime had served as a strike plan. We see fig. b the negative imprint of at least two flakes, Nos. 7 and 8, that were produced after Nos. 4 and 5, but before No. 6.

The sequence of operations is therefore this: first was produced, by blows to the left, many fragments, those in particular whose negative imprint is seen in Nos. 3, 2 and 1. Then, the piece was turned over and knapped at places Nos. 4 and 5 on the right; again it was turned over and knapped at Nos. 7 and 8 on the left; then turned again to knap No. 6 on the right. Here are the steps (third, fourth and following)

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of the knapping of the cores of Smellroren and other sites, what we called knapping by alternating blows, to the right and to the left, along a sinuous cutting edge. When the material allows it, both blades and flakes could be knapped, but it goes without saying that blades and flakes are shorter as the use of the block continues. We can therefore easily explain that, sooner or later, new parts of the block were chosen for knapping, angles or edges, or a new striking plane was used. Obviously, the Valan block is at an early stage of its use, but this bifacial knapping has already given it a sinuous cutting edge (fig. 319d). It presents quite coarse facets that were not only provisional, but the continuation of the knapping would have given it a "chopper" shaped edge, that we constantly see, at all sites, on the quartzite blocks. At the same time, the block decreases in volume and, following practical knapping starting from other planes and along other edges, it gradually has modest dimensions and an angular, rounded or irregular shape, that we know well from other sites, and which makes the purpose of these parts so difficult to specify and sometimes so doubtful. The evolution of the core during more advanced knapping is illustrated by pieces like that of fig. 182, 178, 177 (pl. XXXIX−XLI). Fig. 171 (pl XXXVIII) from Olahaugen shows a core in the later stages of use, because, at least in these later stages, short blades were knapped with alternate blows along a sharp edge. It thus took roughly the form of a bifacial ring. When, in the preceding chapters, we say several times that these pieces, which are originally cores, resemble "choppers", it is appropriate to add that, among the hundreds of pieces of this kind, we perhaps have not found a single one offering unmistakably crushed or chipped parts as a result of shocks against hard objects.

Therefore, the use of the block is often multiple. True discoid cores have an intentionally designed striking plane. But for most discoid blocks, we can speak of practical knapping starting from one or more striking planes, faceted or not, and furthermore of bifacial knapping starting from a sinuous cutting edge. Fig. 182 (pl. XLI) thus shows a core that provided a break by a blow made on a prepared striking surface (fig. b) and, in addition, short blades by blows made on the periphery. Knapping by parallel slices, following a process reminiscent of the Clactonian, does not seem to have been widespread, but examples of it can be found. Thus, fig. 27 from Smellroren shows an oval flake with a very oblique striking surface and a large bulb, the latter having been partially removed by a thin transverse removal (fig. c). On the front side, we see

the negative imprint of a flake knapped previously, by a blow made on the same striking surface.

The core of blades themselves seem to have been subjected to multiple knapping, for example, starting from striking planes located at both ends

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of the same face, longitudinal knapping on the anterior face and transverse on the posterior face, etc.

But there is a detail that reappears almost everywhere and to which we seem to have attached great importance: it is that the striking plane, natural or engineered, forms, in the majority of cores, discoids or elongated, an angle more or less less acute with the bursting plane. This angle is sometimes even very acute, 60° or even less (pl. XLI, pl. XCVI, fig. 432). This results in flakes or blades whose striking plane forms a more or less obtuse angle with the shattering plane and measuring, in several cases, up to 120° or more. And as the striking planes, as we have said, are united or faceted, without there being any great differences in this respect, we can observe in the same site a sort of "pseudo-Clactonian" knapping and a knappng that seems to be "Levalloisian", without this observation having the slightest importance from the point of view of chronology or human geography.

This very oblique arrangement of the striking plane is a purely technical skill. It had the advantage of offering a better starting point for removing flakes, and consequently of obtaining a better result, whatever the tool used for knapping.

It was also not without importance for a later use of the core. Indeed, prolonged knapping often gives them, in a more or less automatic way, an edge which could easily be used as a sort of hatchet. Or they could, almost automatically also, take a shape that made them usable for scraping, or which again, after a slight retouch, could make more or less typical scrapers.

How was knapping carried out? We don't know that very well. Only a small number of hammerstones were found. As everywhere in Scandinavia in the Stone Age, oval quartzite cobbles were used almost exclusively, which were taken as they were available (2 samples pl. XXXIII, fig. 142, pl. XXXV, fig.154). On some, we see a depression on their broad faces that probably served in some way for fixation (fig.154). What proves that these stones were used as hammerstones are the crushed parts that are found at one or both ends, sometimes also at certain points around the middle. However, the number of these hammerstones, 10 in all, is small. In addition, they are extremely light. One weighs about 1.750kg; another only 0.067kg. The average is 0.300kg to 0.450kg. By comparison, we can note that in the Campignian or Neolithic sites in the south of Norway, where such coarse rocks (diabase) were used, we can find in a single site more numerous hammerstones and much heavier than in all our sites combined. Neither by their number nor by their weight do the hammerstones correspond to the wealth of heavy industry in Finnmark. It is then natural

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to assume that much of the primary (and coarse) knapping was done by hitting the block against a fixed base, an anvil, a particularly convenient method with an oblique striking plane, and where the shock is partly due to the weight of the block itself.[1] The hammerstone was therefore undoubtedly used for lighter work. The samples we have do not show the traces of powerful shocks that we see on the hammers of the heavy diabase industry in southern Norway. Even when hammerstones were used, the block, more than once, was also pressed on an anvil. Several pieces (pl. XLIV, fig. 187) have bruises that can only come from there.

Finally, for more delicate work, strikers and hammers of wood (?), and retouchers of wood (?) and bone and antler of deer were undoubtedly used. But the material collected does not provide us with any evidence of this, apart from the good retouching observed on smaller tools.

One of the characteristic features of tool-making in the Finnmarkian is the reuse of cores. At all the sites, and for some in large quantities, we find more or less large cores, or blocks resembling cores, which after having provided blades and flakes have undergone a slight modification, either to thick scraping tools, or to "choppers", or to other less typical instruments, suitable for impacting, cutting or scraping. But we cannot discern a systematic idea in this use of core-formed pieces. What was obtained was a tool of a more or less fortuitous character, one could almost say a sort of accessory product of a real tool industry. And if we set aside this category of parts, the types of tools resulting from a true intentional modification play only a secondary role. They are reduced to a small number of bifaces and other impact instruments, and to a few thick scrapers, shaped directly on blocks or pieces of rock. There are almost no other shaped tools and, in particular, the Campignian and Neolithic pick and ax are completely absent. The dominant character of Finnmarkian tools is therefore the use sometimes of the blade, sometimes − and above all − of the flake. Shards and blades are, as has been said, cut on a suitably arranged cobble, or on a core of discoid or elongated shape and specially prepared.

When the block underwent a real intentional modification, it seems that they mainly thought of giving it a

form such that the cut piece appeared as much as possible in its final state at the very moment when it was

[1] The abbot Mr. Breuil told me that it is believed that it is precisely this way of knapping that explains the heavy industry of the Clactonian. In any case, we obtain completely analogous results, as I myself have had the opportunity to observe. See also the assessment of Abbot BREUIL on the Clactonian, Préhistoire I, p. 131: "Eclats taillés sure enclume, bloc contre bloc."

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detached from the block. For this purpose, certain parts of the edge or striking surface were specially recut, if necessary.

The result of this size of the block is that blades or flakes were finished tools in one fell swoop: large flakes that were used to strike or cut, blades and blades that could be used variously, as knives, for example. In addition, many crude tools with abrupt cutting of the edge, and which could have been intended for scraping or for scraping seem to have been obtained by the preparation of the block itself, without much secondary modification, after knapping. Often present on the upper side of the flake, which is the lower side of the scraper, is an modification consisting of one or more parallel and longitudinal removals that end abruptly and that must have served to give the scraper the desired shape and sharpness (pl. XLVI, fig. 195, pl. XLVII, fig. 196, pl. Cl, fig. 467−469). These removals are therefore obtained by blows perpendicularly to the useful part of the scraper. In many cases, no doubt, it is only a matter of small removals resulting from missed blows during knapping; but more often than not, they are certainly voluntary. Indeed such a quick fix is observed very often, resulting in not only a rough and abrupt cutting of the edge, but also a fine secondary retouch using a scraper, formed on the edge or on the striking surface of flakes, on the plane of strikes, or on the tip of the blades. This must have been a well-established way of preparing the scrapers, and obviously, in most cases, before the actual knapping. As to whether this cutting was intentional or whether it was the accidental result of failed attempts at knapping is another question it is not always easy to decide.

Then comes the majority of blades and flakes which are, of course, semi-fabricated objects, materials from which certain tool shapes could be obtained, by secondary knapping or by retouching. On this question, we refer to the pages that will deal with each type of tool. Provisionally, we will content ourselves with a few general remarks. The quartzite industry in Finnmark used in general a very crude technique, that often has more to do with the size than with the retouching, and which, undoubtedly, is due to the mediocre quality of the raw material. This crude work is especially apparent, as we imagine, on large and heavy tools used for scraping and corresponding to the types known in the flint industry in other countries. But, in addition to these tools, which are identical or similar more or less, for example, to the shapes of scrapers or scrapers known in other civilizations, there are a host of instruments that have been provided with a sharp edge, for cutting or scratching, following a few removals carried out by blows struck obliquely on the edge of the flake or the blade. In general, the modification concerns the lower face of the splinter (burst plane), and it is not uncommon to note at the same time an appropriate modification of the

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opposite face, in order to obtain an edge having the desired shape. Sometimes, several edges of this type are obtained on a single flake by removals that alternate on the upper and lower faces. As we will point out later when talking about crude tools with notches, this technical process is very old.

All in all, the retouching of the bursting plane of the flake is so extraordinarily frequent that it must be seen as a characteristic feature of the Finnmarkian, as well as of the Mousterian on the continent.[1] Quite often the break involves the entire bursting plane; more frequently, it involves more or less extensive parts; the percussion bulb is removed, the striking plane is retouched again or partly deleted. Normal retouching is very often also practiced on the lower side. This remark applies both to large objects and to smaller objects, shaped on blades and in a rock that is easy to work. Thus, retouching with a scraper is carried out on the lower face, either at the edge of the flake or the blade, or on the striking surface or at the point. The striking surface in particular is very often retouched with a scraper on the side of the lower face, which was very easy, because it formed in advance an acute angle. Likewise, the dorsal retouching of the knife blades can involve the lower face or alternate; but we also very frequently find on these tools an interesting retouch on the bulb of percussion (pl. XXXII, fig. 132, 135). There is also a retouching of the lower face or an alternate retouching, often quite flat, of the small points similar to those of Abri-Audi, and naturally, although the thing is of little importance, of the small and large tanged points. As for the nature of the retouching, we find on coarse quartzite tools, such as scrapers, sometimes quite a long retouching process, that can also be said to be analogous to Mousterian work. The quick retouching in flakes of the Quina scrapers, which moreover is undoubtedly more or less accidental, is very rare. Lengthy retouching of the same type is also found on the

small points similar to those of Abri-Audi and on some other pieces. On the other hand, blades and bladed tools, such as knife blades, have an abrupt retouch, of the type that is common in the blade industry of the Aurignacian, Magdalenian and Late Neolithic. Examples of flat retouch, resembling Solutrean retouch, are rare. At most we can cite 3 or 4 pieces that resemble the Proto-Solutreen.

3. Implements.

Handaxes. Blunt tools. Different sites where a large-scale industry of large tools was practiced provided tools specially intended for impact. Some must be characterized as true

[1] See e.g. H. OBERMAIER: Moustérien in M. EBERT: Reallexikon der Vorgeschichte, t. VIII, p. 317.

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handaxes. A very fine example comes from Smellroren (pl. XLIII, fig. 186); made from a flat and elongated cobble, with a regular retouch towards the tip, and for the rest, a more hasty modification. In terms of shape and quality, there is an exact match between this piece and the good amygdaloid coups-de-poing from the cobble industry of southern France[1] outside the flint region. A use of the point, analogous to that of the piece mentioned at Smellroren, is shown on the piece fig. 315 (pl. LXXII) from Skjånes, the heel of which is roughly shaped, in a way that makes one think of a very heavy scraper. Pieces prepared to provide such amygdaloid tools are shown in Figs. 185, 187, 276 (pl. XLIII, XLIV, LXII); the first two are only half knapped, while the third did not fit correctly at the point, due to a defect in the rock used; the only difference is that in these three pieces, the knapping had to be more extensive, because the raw cobble was thicker. There are also tools knapped on both sides, but with a strongly swollen upper side and a flatter lower side, a shape reminiscent of the discoid cores. The knapping of the edge is quite similar to a rough retouch using a scraper (pl. XLII, fig. 183). However, tools of this quality are rare in Finnmark. In general, the knapping is not only limited, but even more or less accidental, and the shapes, consequently, less distinct and more variable. We find more or less characteristic cordiform pieces (pl. LXXXVIII, fig. 381, pl. XLII, fig. 184), pieces with an oval outline (pl. LXXXIV, fig. 358), or elongated, with a wide, thick heel and a narrow point. A good sample of this kind at Valan, that was knapped around its perimeter, and resembles very ancient forms of Asturian tools[2] is reproduced in fig. 322 (pl. LXXV).

The knapping of this last tool, like that of pieces similar to fig. 186, is obviously intended to form a sharp or pointed end for impact. Overall, the different sites have provided a fairly large number of these sharp impact tools, but they generally result from very simple knapping, which mainly concerns the tip, and is accompanied by slight modifications for gripping. The pieces thus knapped come from more or less thick cobbles or plates (pl. LXXIV, fig. 321, pl. LXXV, fig. 323, pl. LXXXIV, fig. 357, pl. LXXXVIII, fig. 382), and the work is so hasty that it seems intended for an immediate need. It is a crude and simple part-time industry, but analogous cases are not lacking in the Paleolithic, even in the classic areas of this civilization.[3]

[1] See e.g. J. B. NOULET: Étude sur les cailloux taillés par percussion du pays toulousain et description d'un atelier de préparation dans le vallée de la Hyse (Hte Garonne). Archives du Musée d'histoire naturelle de Toulouse. Deuxième publication. Toulouse 1880.. By the same author: Nouvelles études sur le gisement quarternaire de Clermont près de Toulouse. Ibid., troisième publication. 1881 Toulouse
[2] H. OBERMAIER: Fossil Man in Spain, p. 351, fig. 148. Newhaven 1925.
[3] See e.g. H. BREUIL: Etudes de morphologie paléolithique, II. Revue de l'Ecole d'Anthr. de Paris 1911, fig. 16.

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Sometimes, pieces of cobbles or flakes of varying thickness were used (pl. XXXV, fig. 157, pl. XLII, fig. 184), and this can result in shapes that resemble the "Halbkeils" of German prehistorians and certain types of Micoquian (pl. XXXIII, fig. 138, pl. XXXVI, fig. 158, 161, pl. LXVII, fig. 297).

In other cases, it was attempted to produce a large cutting edge used to cut or strike a blow. Let us cite the large instrument fig. 337 (pl. LXXIX), a rectangular quartzite plaque that has a sinuous cutting edge on one bifacel (seen from the front in the figure), while the opposite edge is made for gripping. Many of these tools with a large sharp edge can, without hesitation, be characterized as true "choppers"[1] (pl. X, fig. 17, pl. XXXVIII, fig. 170, pl. L, fig. 211, pl. LXVIII, fig. 302) derived from cobbles or thick flakes that have undergone primary knapping. In other cases, they come from the knapping of core pieces, and the discoid cores have very often, through use, taken the form of a "chopper". It is therefore extremely difficult to decide whether the form is intentional or not. In the large quartzite sites, such as Smellroren, we find all

intermediate stages, from unused discoid cores, to tools resembling "choppers" or other biface-cut impact tools.

We also hesitate to characterize pieces such as, for example, fig. 206 (pl. XLIX), fairly thin tools, derived from flakes, by two-sided cutting along the edge. One might wonder if these are punch blades, or rather two-sided scrapers. The same question arises about beautiful little tools, like the one in fig. 66 (pl. XX), well retouched on a hornstone flake. This one too, in my opinion, would be more of a scraping tool.

Regarding this tool, it is appropriate to cite others, a little larger, that are similar to it. They are also derived from flakes of medium size through a fairly rough knapping on both sides all around. Some are or less identical to "throwing stones", bifacial discs from the Acheuleo-Mousterian of Western Europe, the Moustero-Aurignacian of Moravia[2] and other cultural groups, including Neolithic groups (pl. XX, fig. 63, pl. LXXXIII, fig. 354; fig. 41 in the text). Others have more the character of round bifaces. In this group of tools are all the intermediate stages, up to the core, which is widely used for all around knapping (pl. XXXVIII, fig. 171).

It would naturally be completely wrong to speak of a handaxe industry in Finnmark, on the basis of similar tools, the number of which is quite insignificant, which,

[1] For the form, see, e.g. W. G. SMITH: Notes on the Paleolithic Floor near Caddington, fig. 16 and 18. Archaeologia, t. 67, p. 49 etc.
[2] Example of the periphery of this area. W.G. SMITH: Notes on the Paleolithic Floor near Caddington fig. 14 and 17. Archaeologia, t. 67, p. 59. K. ABSOLON: Otaslavice, eine neue grosse palaeolithische Station mit Quartzit-Aurignacien.Taf. XV, fig. 250. See also R. NEUVILLE: L'Acheuléen supérieur d'Oumm-Qatafa, fig. 10, No. 1. L'Anthropologie, t. XLI, p. 31.

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in addition, very often have an untypical shape, and for many, offer the character of tools shaped for immediate use, or even by-products or accessories of genuine tool making. Both from a chronological and cultural point of view, we must in any case be careful not to exaggerate the significance of these quite often atypical pieces[1]. When it was necessary to have tools or weapons used for percussion and shock, or to crush bones, or for any other use, they have had to give way to others. Thus were used cores, core-formed pieces and adapted cores − in addition to numerous large flakes and some tools resembling flakes. As we have had the opportunity to point out, pieces of this type are found in great numbers at the sites, in different stages of use, and the discoid cores themselves, by dint of having been used, often offer a sinuous cutting edge which makes them suitable for hitting and scratching (pl. VII, fig. 2, pl. XLI, fig. 181, 182). This is even more true of the discoid cores which, moreover, seem to be intentionally adapted for the same use. Likewise, rounded cores, especially those of quartz, are often knapped in such a way that it was necessary to make them usable as blunt tools (pl. XXIX, fig. 114)

The use of large flakes. — The lithic industry of Finnmark is to the highest degree an industry of fragments. Not only are flakes the starting point for modification for many real tools (scrapers, slicers, points, etc.), but we also find, at several sites, a variable number of flakes, used without modification, or with a very limited modification, and which were intentionally knapped for this use. It is naturally in the heavy quartzite industry that we mainly make this observation, although there are also some discoid cores of flint and hornstone, prepared for knapping of flakes. According to what we said above about the cores and the knapping in general, we will understand that the striking plane of the flake sometimes forms a very sharp angle (fig. 27 and pl. LXXXIX, fig. 385), and sometimes with facets (pl. XIII, fig. 29, 30, pl. XXX, fig. 116 etc.).

On many flakes, we see that they were used in their raw state, as blunt or scraping tools. They have chips or crushes on the edges or at the tip; or else they were broken. Others are roughly knapped at the point to form blunt tools (pl. IX, fig. 6, pl. XXII, fig. 78, pl. XLV, fig. 190, pl. XLVII, fig. 199, pl. XCII, fig. 404). These are sometimes large and heavy tools that must be characterized as to their destination, as real coups-de-poing. As an exception, the point may have the shape of a narrow scissor, with small removals due to retouching or use (pl. XXX, fig. 116). In

[1] In particular because the handaxe industry more and more appears to belong to a less limited domain than was first supposed. See the abundant literature devoted to this question. R. KOPPEL: Untersuchungen über die Steinzeit Palästina-Syrians, especially p. 37 etc. Rome 1933.

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other cases, the large flakes are recut more or less roughly into scrapers on parts of their perimeter (pl. XII,

fig. 22, pl. LXXXIX, fig. 384), very often with one or more notches, more rarely with denticulation of the edges (pl. XXX, fig. 116).

An interesting combination, and frequent enough that it is almost a type, is represented by the figs. 125 (pl. XXXI), 191 and 192 (pl. XLV). These are average flakes, with a narrow, pointed tip, that is retouched or crushed by use, and a retouched or modified heel. On the edges, we observe one or more notches and moreover, on the piece fig. 191, a side scraper.

A glance at the figures cited, and at others, will show that the striking surface, originally plain or faceted, is very often subjected to invasive cutting, that the bulb of percussion is cut or removed, that the cut very often concerns the lower face of the flake. These features of the technique, which we find everywhere at our sites, combined with the use of very large flakes, contribute to creating a resemblance between our quartzite industry and the ancient flake industries of central and western Europe.

Tranchets. — At several of the Finnmark sites, we find instruments equipped with a sharp edge, that are the same or more or less analogous to the Campignian tranchets. From a technical point of view, they are similar, in that they are knapped across a flake or broad blade, with a natural, unretouched edge, formed by the edge of the flake. However, the modification process is rarely as typical as, for example, for the tranchets of the Danish kjøkkenmøddings, which is partly explained by the nature and greater or lesser abundance of the raw material, and partly − or rather mainly − by other reasons that we will talk about later. The bulb of percussion, in all these tools, was on one of the lateral edges. It is easily seen on the same pieces and we also recognize it on one or two reproductions. In a few slightly atypical pieces, it has been preserved (pl. LXXI, fig. 312). The knapping of the edges is, almost without exception, made on the striking plane, that is by blows given to the upper surface. In many cases, it is symmetrical on both edges; sometimes the edge is formed by a simple unretouched fracture; in only one case the knapping alternates on the two edges (pl. XXIII, fig. 83). The character of the knapping is variable; sometimes coarser and sometimes finer. More than once, it has the effect of a retouch intended to transform the piece into a scraper or scraper; it is then, sometimes combined with an appropriate modification of the lower face of the scraper (that is to say of the upper face of the flake). This is, in particular, the case of some atypical pieces that we would call scissor scrapers (pl. LXXI, fig. 311, 312) or scissor scrapers (pl. XVIII, fig. 53), more rarely that of the more characteristic tools (pl. XXIII, Fig. 82). On the other hand, on the latter, one of the edges is sometimes specially modified in another way, a blow

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delivered obliquely resulting in a single, large removal on the lower surface, often completed by a secondary modification of the opposite surface. The result is a more or less sharp edge (pl. LII, fig. 217, pl. LXII, fig. 278), that was very suitable for cutting or scraping. As has often been said, this technique is extremely widespread in the Finnmark flaking industry and there is no doubt that the edges were intentionally cut to make the useful part more effective. But this does not deny the fact that it is above all the cutting edge that properly constitutes the tool. In most samples, particularly those from sites believed to be the oldest, they also show more or less visible traces of use. In one case, the cutting edge has been finely retouched (pl. LII, fig. 215).[1]

In the tools that we group under the name of tranchets, the shapes and dimensions are very variable and range from small irregular or rectangular instruments, 0.04m in length (pl. C, fig. 458), up to elongated axes with cutting edge at one or both ends, and made by the tranchet technique (pl. LII, fig. 215−216), or the large and heavy sub-triangular tools, that are identical to the "grand tranchet" typical of the Campignian (pl. XXIII, fig. 82, pl. LII, fig. 217, pl. LXII, fig. 278). The number of tranchets in the different sites ranges from 0, to one, to a dozen more or less typical pieces (Seilmerket II, Smellroren, Zoar).

As we know, tranchets have been around for a long time in very varied forms for the characteristic types of the Campignian. Today this opinion is offered only with reservations. Not only is it possible that this type was maintained in the north at a later period,[2] but it is also found at an earlier period, around the Mesolithic in Northern Europe.[3] We see this in the civilization of Fosna[4] on the west coast of Norway and at sites of Østfold and Bohuslen which, according to geological conditions and for other reasons must be ancient.[5] Outside the Nordic domain, it will suffice to recall that Commont[6]

[1] I could not agree with the opinion that these tools were scrapers, and not pieces originally intended to serve as axes. See BJØRN: Studier over Fosnakulturen (Studies on the Civilization of Fosna) p. 32, Bergens Museums Årb., 1929.

[2] This is what OTTO RYDBECK was the first to say: Hava den äldre stenålderns redskapsformer stundom levat kvar ändå in i gånggriftstiden? (Did early Stone Age tool forms survive into the age of gallery burials?). Fornvånnen, 1930, P. 136 etc.

[3] See e.g. G. SCHWANTES: Nordisches Paläolithikum and Mesolithikum, p. 223, fig. 2. Even the

Ahrensburg civilization (Schwantes, p. 183) shows tools that are perhaps analogous. At the Provincial Museum in Kiel, an atypical tranchet was noticed, with a sub-triangular outline, with chips and very worn notches on both edges.
[4] A. BJØRN: Studier over Fosnakulturen, fig. 1−5. Bergens Museums Årbok,1929.
[5] J. ALIN, N. NIKLASON och H. THOMASSON: Stenåldersboplatsen på Sandarne vid Goteborg (The Stone Age site of Sandarne near Gothenburg) p. 77 et seq. Göteborgs kungl. Vetenskaps- och Vitterhets-Samhälles Handlingar. Ser. A, t. 3. Göteborg 1934.
[6] V. COMMONT: Les terrains quaternaires de tranchées du nouveau canal du Nord, fig. 21, No. 2. L'Anthropologie, t. 27, p. 343.

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and Peyrony reported in their publications about tools from the French Mousterian that are characterized as real tranchets;[1] and as far as South Africa is concerned, the tranchets are rightly characterized as "eine Leitform des südafrikanischen Altpaläolithikums".[2]

I naturally do not claim that there is any close relationship between groups so distant in space and time. What I really mean is that tranchets and similar instruments equipped with a sharp edge will appear without difficulty in a more or less automatic way in any industry heavy with flakes. These are the easiest tools to make. Any flake generally has a sharp and perfectly usable edge, and one need not do more then adapt this tool for gripping or fitting, by a more suitable modification, which could be, and which has often been very simple.[3] The variations in shape and size of the tranchets in the groups cited, from the North Cape to the Cape of Good Hope, are so considerable that what brings these groups together is above all their name and the primary process of the technique that consists of cutting or breaking through a splinter or a wide blade. But this margin of variation is not such that it cannot be observed even within the Finnmarkian.

This is how several sites in Finnmark provided bases (lower parts) of blades or flakes with parallel edges. We can see the bulb of percussion and, at the other extremity, a transverse fracture. It was not retouched and it was not necessary. Some of these pieces have a fortuitous character, such as figs. 326 and 453 (pl. LXXVII and XCIX); others come closer

[1] D. PEYRONY : Le Moustier. Ses gisements, ses industries, ses couches géologiques, fig. 8, No 10; fig. 16 Nos 8 et 9. Revue Anthropologique 1930. By the same author: La Ferrassie, fig.15 et 23. Préhistoire III, p, 1 et suiv. Paris 1934. The same: Etude de formes inédites ou très peu connues du Moustérien etc. fig. 3. Revue Anthropologique, 1925. The same: Site préhistorique de la Gare de Couze etc, fig. 8, Nos. 2 et 3. Périgueux 1932

This last example especially is entirely typical. Peyrony describes his tools as follows:..."several trapezoidal or triangular instruments, with a sharp or jagged edge, opposite the short side or the top". There should also be no doubt about the use that was made of these tools. I also saw, a dozen years ago, at the Museum of Eyzies, some tools resembling tranchets, sub-rectangular in shape, that had been shaped by two parallel transverse fractures across a large flake, much like some of our sub-rectangular tools. − For double slicers, see the study on the Levallois flake, by V. COMMONT: Le gisements préhistoriques de Saint-Acheul et de Montières. Noted de Préhistoire publiées dans le Bulletin de la Société Linnéenne du Nord de la France. Amiens 1911.
[2] V. Lebzelter: Die Vorgeschichte von Süd- und Südwestafrika, p. 92. Leipzig 1930. − Lebzelter shows pieces Nos. 3 and 32A in fig. 16, pl. XXIII, No. 1.
[3] In reality, little separates me on this subject from C. A. Nordman, when he asserts that these scattered groups of Campignian tranchets can have arisen independently of each other, partly under the influence of the large areas of the continental Neolithic. C. A. NORDMAN: Den yngre stenåldern i Mellan-Vest- og Nord-Europa (The Neolithic period in central and western Europe and in northern Europe). p. 33 etc. − De forhistoriske tider i Europa (Prehistoric times in Europe), by K. FRIIS JOHANSEN, t. II, Copenhagen 1927.

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to one- or two-edged cleavers with a rectangular outline. In reality, they are always the same tools, except that the last ones have undergone intentional cutting or retouching along one or two truncations, and that the bulb of percussion has most often disappeared. Several have two edges (pl. VII, fig. 3, pl. VIII, fig. 4, pl. LIII, fig. 218, pl. LXVII, fig. 296, pl. C, fig. 458), and have completely retained the character of splinters or broken blades. Among the samples cited, we should particularly mention fig. 4 (pl. VII), which must be called a broken blade with retouched ends, rather than a tranchet. That the cutting edge was the essential part and that the shape played a less important role is what seems to result from the examination of tools like fig. 459 of pl. C, a small double rectangular tranchet, which received a third edge following transverse removals

(to the left of fig. b). Even the single-edged pieces partly preserve this primitive rectangular shape (Plate XXIII, fig. 83, Pl. XXXII, fig. 131), but usually the shape is more accidental, the outline is closer to a triangle or trapezium. As has been said, there are also samples of a pure Campignian type. In only one site, Smellroren, can also be found scissors elongated or axes derived from flakes, the exact equivalent of which we see in kjøkkenmøddings, but even among these latter pieces, some, like that of fig. 215 (pl. LII), have two edges, one of which has a fine retouch.

Without being able to claim decisive proof, it therefore seems that the "tranchets" at least could have appeared in the industry of Finnmark without external influence, in any case independently of the civilization of the kjøkkenmøddings. As chronological reference points they are therefore of little use. Neither does there seem some chronological differences between the different forms of Finnmarkian tranchets. Thus, in Smellroren, all forms are represented; large triangular pieces, real tranchets, rectangular flakes or truncated blades, and finally elongated axes derived from flakes, with one or two cutting edges. The triangular tranchets of true Campignian type are found even at the sites that are supposed to be the oldest.

At Smellroren, and there only, a special and rare tool form appears that resembles tranchets. They come, like these, from large flakes. But the knapping along the edges is flat and, when necessary, bifacial, so that the edge becomes a sinuous and sharp edge. The knapping mainly attacked the plane of fracture and the bulb of percussion has disappeared (pl. LI, fig. 213, 214). These are quite large and heavy tools, the like of which I have not seen in the north of Europe. On the other hand, they correspond perfectly to the large cleavers of southern France, Spain and northern Africa, which, with some differences in these various regions, belong to an era that goes at least from the Middle Paleolithic to the Azilian.[1]

[1] H. BREUIL: L'Afrique préhistorique, Cahiers d'Art. 1931, fig. 9.

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Axes and picks. — These instruments are surprisingly rare. Naturally it occurred, more or less fortuitously, on fragments or on widely used cores, cutting edges, edges or tools also resembling hatchets, especially in the heavy quartzite industry. But we have very few samples − and still few characteristics − of hatchets resulting from a true intentional modification (pl. XXXVI, fig. 160, pl. XCIX, fig. 451). Let us also mention a very heavy tool (pl. LXV, fig. 288), that nevertheless deserves the name of trencher. In Smellroren only a few real axes can be found, which, however, are shaped on flakes with the tranchet technique (pl. LII, fig. 216). There are also some pieces that can perhaps be characterized as picks, unless they are rather, either retouchers, or also a kind of tranchet (pl. LI, fig. 212).

It must be repeated that the Campignian or Neolithic pickaxe and axe are completely missing in our collection of tools.

On the other hand, there are naturally many narrow or wide scissors of totally or semi-fortuitous origin; it is quite rare that they are finely retouched on flakes (pl. XXI, fig. 70, pl. XXVIII, fig. 108, pl.).

The points, of varied shapes and dimensions, are a constant equipment element at most sites. Let us first recall that at many sites, especially those where quartzite has been extensively worked, there are beautiful triangular flakes of fairly constant shape and dimensions, without secondary modification, but of a true Mousterian character. These are fairly thin pieces, often with a distinct middle ridge. The bulb of percussion is at the base, the striking surface is plain or very often faceted; the piece, consequently, was knapped on a prepared block (pl. LV, fig. 228). Many of these points come from Smellroren; Vedbotneidet also provided a dozen, other sites a smaller number. There can be little doubt that most of these pieces are the result of intentional work. And certainly, they were quite usable as frames for spears or spears; several even have chips on the edges which, sometimes, are due to use, sometimes to a slight modification of the edges (pl. XXV, fig. 89, pl. LV, fig. 227, pl. LXXX, fig. 342 , pl. More rarely, they have a fine local retouch of the edge (pl. XIII, fig. 24, pl. LIV, fig. 223, 224 etc.). Sometimes they are recut more roughly (pl. LV, fig. 226). By a fairly abrupt retouch, or by a good flat retouch (pl. XXV, fig. 87, pl. LV, fig. 228, fig. 28b in the text, etc.), they can also take forms that make them analogous or identical to the typical Mousterian point. In general, the base is so thin that it lends itself easily to fitting. When the piece was thicker, it was readily thinned by one or more longitudinal removals on the upper face and more rarely

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on the lower side. This is what we see on most of the examples shown. This trait is so general that it cannot be due to chance.

Thin triangular points of this type are common in many places in the Mousterian quartzite industry. Thus, as far as Central Europe is concerned, we can refer to the finds of H. Richter at Treis on Lumda and to the different sites in Moravia, that were studied by S. Absolon.[1] A point like that in fig. 87 (pl. XXV) is

extremely close to what Absolon calls a classic form of Predmost.[2]

In addition to these broad points, we also find at certain sites, and in large number in Smellroren, elongated points that were cut along the edge of a block, or, in very frequent cases, along the edge of a cobble. Their cut is, therefore, thick and triangular, generally with a very distinct dorsal ridge. These points must also have been intended for fitting; in any case, their base has generally been thinned by longitudinal removals or in another way. The points were retouched or adjusted towards the end, when that was necessary or desirable (pl. LV, fig. 225, pl. LVI, fig. 236, 237). In the good blade industries of the recent Paleolithic, we also find points that are reminiscent of ours. However, they often have a retouch in their lower part and must, therefore, have had another purpose.[3]

This modification, which is common in the quartzite industry in other regions,[4] could be supplemented or replaced by one or two rough removals on the edges of the basal part, on the upper or lower face of the piece. This is what we observe both on elongated flakes and on large triangular flakes (pl. XIII, fig. 29, pl. XCI, fig. 392; see also the large blade pl. XIII, fig. 30, which presents at the same time a lateral removal and a thinning at the base), sometimes, if necessary, with pruning along the edges, (pl. LV, fig. 226). But all this does more than indicate a real tang, and we see that in fact a certain number of elongated or wide flakes have a distinct tang, resulting from gross removals at the base on both edges, and completed or not by a thinning (pl. XXV, fig. 90, pl. XXVI, fig. 91, Pl. XXXII, fig. 130, pl. LXXXI , fig. 345, 346, pl. LXXXVI, fig. 372, pl. XC, fig. 391).[5]

[1] See e.g. K. ABSOLON: Otaslavice, eine neue grosse palaeolithische Site in Mähren mit Quartzit-Aurignaelen, Pl. III, fig. 18 etc. Mitteilungen sus der palaeolithischen Abteilung des Mährischen Landesmuseums No. 40. − HEINRICH RICHTER: Die altsteinzeitliche Höhlensiedlung von Treis a. d. Lumda, especially Pl. X, and figs. 14, 15 and 25. Abhandlungen der Senckenbergischen Naturforschenden Gesellschaft, t. 40, fasc. 1. Frankfort 1925. − See also D. PEYRONY: Station préhistorique de la gare de Couze our de Saint-Sulpice-des-Magnats, fig. 4−5. Périgueux 1932.
[2] ABSOLON: cited work, p. 19 and fig. 9.
[3] See M. BOURLON: Nouvelles découvertes à Laugerie-Basse etc. fig. 8−10. L'Anthropologie, t. XXVII, p. 4.
[4] See e.g. RICHTER, op.cit, p. 48 and fig. 36.
[5] A piece, which, judging by the figure, must be almost identical to our pieces fig. 90, 372 and 391, is shown in K. ABSOLON and R. CZICZEK: Die palaeolithische Erforschung der Pekarna-Höhle in Mähren. Dritte Mitteilung für das Jahr 1927. Pl. VI, fig. 6. Brno: Brunn 1932.

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Finally we have, at Vedbotneidet, two large and magnificent spear points, with well-retouched tangs and intentional thinning (pl. LXXXI, fig. 343, 344). These two points are broken, but it seems that an attempt was made to sharpen them by removal along the fracture. Originally, they had a contour roughly similar to that of certain sole points from the final Aurignacian or other later stages (Lyngby), although the dimensions are very different.[1] One of them also has side notches, perhaps to serve as a support point for the fitting.

Next to these thin triangular flakes, which did not require more than a slight retouch, we have some thicker and less typical pieces, with lateral retouches on one or two faces (pl. XXXIV, fig. 148, pl XXXIX, fig. 174, pl. XCII, fig. 405, 406, pl. CIII, fig. 483). However, the number is insignificant when we think of the great many finds. We also find small numbers of large flakes with a thick and swollen, or large and sub-triangular section. The modification consists of a partial retouching around the edges, or of a flat retouch that can invade the upper face (pl. XXXVI, fig. 158, 161, pl. LIV, fig. 224). The pieces may have some resemblance to a "Halbkeil", and they were certainly made to be held in the hand. For fig. 224, this is certain, because at the base of the piece there is a thick narrow scraper or some sort of burin.

On the other hand, we have a large number of sub-triangular points derived from small flakes or short and wide blades, by retouching on an edge that has thus become quite thick and slightly convex. The opposite edge is straight, slightly inflected outwards or inwards, and it has, in general, retained the naturally sharp cutting edge of the removal. Rarely, resharpening has been necessary, but flakes are often observed on the edge. The dorsal retouch often has the character of a true blunting, but it is most often flat; sometimes it is practiced on the lower face, or it alternates on the two faces; finally it can be microscopically fine. In general, the back is retouched along its entire length; in rare cases the retouching is limited to the part close to the tip; in others, it is precisely this part of the piece that is not retouched. This type of point, made from rocks of different kinds, occurs at many sites and sometimes in considerable numbers. They are mainly found in Smellroren, Steinseng, Storbukta (around 3 dozen) etc. The dimensions are generally small, from 0.03m to 0.05m, rarely 0.08m. A selection of examples is reproduced in Figs. 8, 26, 27, 92, 136, 220, 229−235, 269−271, 281, 369−371, 393, 484−488 etc.

[1] See H. BREUIL: Subdivisions, fig. 12, No. 14, and in the present work, pl. CIV, fig. 493, 494 from Steinseng. − In the Mousterian also, there are points with a sort of tang. See PEYRONY: La Ferrassie. Préhistoire III, p. 12, fig, 9. − By the same author: Etude de formes inédites ou très peu connues du Moustérien etc. fig. 5, No. 1, 2. Revue Anthropologique 1925.

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If we take into account neither its dimensions nor the more quick work that characterizes the quartzite industry in Finnmark, the mass of these points is very closely related to those of the primitive Aurignacian, which received its name from Abri-Audi.[1] On the continent, it mainly belongs to civilizations with the character of the primitive Aurignacian, and reappears sporadically in the recent Magdalenian.[2] In Scandinavia, this form has not been observed before now, and outside of the Nordic countries, Luneburg seems to be the closest place where it can be found, in Paleolithic strata, points that can be exactly compared to ours.[3]

Some of these points have a shape that tends more or less towards the "half-moons" of the same cultural region. These are both large and smaller samples (pl. LVIII, fig. 247−249, pl. LXVI, fig. 295), and these cases are due doubtless due to the accidents of the retouching. Others are derived from broad and short blades, with retouching or blunting along one edge or with an oblique truncation at the point (fig. 18 and 22 in the text). They are quite far from the ideal type of the tip, but no more than the corresponding pieces of classic French sites.[4] On the other hand, we find quite a large number of longer pieces, all the intermediate shapes that lead to the narrow blade-knives with turned backs, of the general type of Châtelperron, of which we will speak later.

Burins. — There are burins at almost all important sites in Finnmark. In some sites, such as Steinseng, Seilmerket II etc., there is a considerable number of them. However, they are not always easy to discern. In addition to those that are easy to identify when we compare to the models of classic sites of the recent Paleolithic,[5] we find a host of simple and crude forms, which in part are undoubtedly fortuitous, but the greatest number of which are composed, without a doubt, of real burins resulting from an intentional adaptation. The rudimentary aspect is due to extremely basic work, as well as the quality of the raw material and the condition of the rock used. Also it is relatively rare to find burins made on really good blades.

[1] H. BREUIL: Etudes de morphologie paléolithique I. Revue de l'Ecole d'Anthropologie 1909, p. 320. − See by the same author: Les subdivisions etc. fig. 1, Nos 1−4. Congrès international, Genève Geneva 1912. − G. LALANNE: L'abri des Carrières, dit l'abri Audi. Ates de la Société Linnéenne de Bordeaux LXII. 1909.
[2] H. BREUIL: Subdivisions etc, fig. 46.
[3] HANS PIESKER: Vorneolithische Kulturen der südlichen Lüneburger Heide pl. IX, fig. 4 etc. Veröffentlichungen der urgeschichtlichen Sammlung des Provinzialmuseums in Hannover, t. III. Hildesheim und Leipzig, 1932.
[4] See e.g. D. PEYRONY: Le Moustérien. Ses industries, ses couches géologiques, fig. 11, Nos. 1−4. − Compare: the same work, fig. 4−5. Revue Anthropologique Nos. 1−3, and 4−6, 1930. − By the same author: Eléments de Préhistoire, fig. 11, No. 4. Ussel 1914.
[5] We refer once and for all to the well-known typological presentation by M. BOURLON: Essai de classification de burins. Revue Anthropologique, No. 7, 1911.

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Most often, ordinary blades were used, flakes of any shape, or even blocks or core-formed pieces. Modification then consists of adjusting an ugly corner, often in the simplest and most convenient way, that is to say by a single removal, rarely by several. In this group, we find shapes that can be compared to coarse Mousterian burins from France, for example, and in Palestine[1]; Others resemble ordinary Upper Paleolithic burins. Selected coarse burins are reproduced here, pl. XXXVIII, fig. 169, pl. XLIX, fig. 208, pl. L, fig. 209, pl. LX, fig. 263, 264, pl. LXIII, fig. 282, pl. LXIX, fig. 304, pl. LXX, fig. 310, pl. LXXII, fig. 318; in this number, fig. 169 and fig. 282 are a kind of polyhedral burins on thick flakes, fig. 209, 310 and 318, types of flat burins also on thick flakes, fig. 264 a transverse burin on a core. The piece fig. 208 received a burin beak at both ends, by means of a single rough removal.

Among the more ordinary types of burins, there are some really good and typical ones. Ordinarily, however, the shapes are rather fortuitous, either because the raw material was often mediocre, or also because, for these lighter tools, blocks or flakes of irregular shape were mainly used.

Some of these pieces form a transition that leads to the core scrapers; or we can consider them as thick core scrapers with one angle sharpened (pl. XXVI, fig. 93, pl. LXVIII, fig. 301; fig. 9c in the text; pl. XLIX,

fig. 205: "burin"); others, obtained on blocks or thick flakes, make the transition with thick scrapers sometimes with keel scrapers. A more or less rough cut results in shapes similar to those of busque burins, not very typical and without a notch[2] (pl. XXVIII, fig. 108, pl. LIV, fig. 224; fig. 6a, bottom, and fig. 19 in the text). Sometimes one may wonder whether the tool should be characterized as a busque burin or a very narrow keeled scraper. This remark is especially valid for a special type whose extreme forms are represented by figs 260, 261 (pl. LIX), fig. 426 (pl. XCVI), fig. 475 (pl. CII),[3] and which appear at a number of sites. These are large, solid tools, cut on the angle of a large triangular or sub-triangular flake. The bevel of the burin is formed, on one side, by a bursting plane that is generally concave, in only one case (fig. 426) slightly convex, with intentional removal by the burin towards the end. The opposite side is formed by several removals more or less

[1] R. NEUVILLE: L'Acheulén supérieur d'Oumm-Qatafa, fig. 12 and 18. L'Anthropologie t. XLI, p. 33, 42. − V. COMMONT: Les terrains quaternaires des tranchées du nouveau canal du Nord, fig. 21, 22 et 23. L'Anthropologie, t. XXXVII, p. 342 etc. − D. PEYRONY: La Ferrassie, fig. 20. Préhistoire, III, p. 19. Paris 1934.
[2] On the evolution of the keel scraper and busque burin, see BARDON and BOUYSSONIE: Grattoir caréne et ses dérivés. Revue de l'Ecole d'Anthropologie de Paris. Nov. 1906.
[3] See on this subject, e.g. H. BREUIL: Subdivisions etc. fig. 7, No. 2.

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irregular, which sometimes have a retouching character. Despite a rough and rather crude execution, which is partly due to the state of the raw material, this type of burin is in reality very constant.

However, the enormous majority of burins come, as has been said, from fairly thin flakes or from blades of some sort. Ordinary modification consists of performing a longitudinal removal on a blade or on a splinter, at the angle of a truncation, a fracture, or a transverse or slightly oblique splinter plane. Removal is obtained by a blow perpendicular to the plane of this surface, exactly like the classic burin blow. Chip marks are also found at several sites, pl. XVI. If the truncation or fracture remained unretouched, the result was a sort of corner burin on a broken blade. These pieces are found in very large quantities and have all dimensions; sometimes they are quite crude (pl. XVII, fig. 47 etc.). Some are probably makeshift tools, but the greatest number results from intentional work. Sometimes, the burins are double or triple, either because there is a diagonal angle at the two ends of a blade (pl. LIX, fig. 258), or because the two angles of the same end have been sharpened. This last case is very common and is observed both on blades (pl. XXVI, fig. 98) and on more or less thick flakes, as well as on narrow core-form pieces (pl. IX, fig. 9, pl. XXXVII, fig. 165, pl. LIX, fig. 259, pl. .IX, fig. 11). Sometimes the truncation is retouched or rather modified by means of slight removals (pl. XXVII, fig. 102, pl. XCVII, fig. 439).

Rarely the angle is recut by a perpendicular blow, not to the fracture plane, but to the plane of the blade (pl. X, fig. 14).

Another main group includes burins which, in addition to removal by a burin stroke, have a more or less regular retouch on the fracture or on the truncation of the blade, always obtained by small blows on the lower face of the piece. We thus obtain retouched truncation angle burins (transverse or oblique, convex or concave), that correspond exactly to the classic shapes of the Aurignacian of Western Europe, although the retouching is of less good quality. As examples, we can cite among others: fig. 48−50 (pl. XVII), fig. 103−106 (pl. XXVII), fig. 107 (pl. XXVIII), fig. 350 (pl. LXXXII), fig. 414 (pl. XCIV), fig. 427 (pl. XCVI). It is especially in these series that blades have been used, although it is not uncommon for a suitable angle of broad flair to receive the same treatment; but then, almost without exception, with a "concave" truncation, formed by a good retouched notch (pl. XV, fig. 37, pl. XXVII, fig. 106, pl. XCVI, fig. 428). Large blades, cut on small blade cores (pl. XCVI, fig. 432) gave about the same result, without modification or with a very slight modification of the truncation, which then is formed by

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the faceted or very oblique striking plane of the original core (fig. 39 b in the text). Inside this group, we also find some pieces that are similar to plane burins (pl. XXXVII, fig. 107, pl. LXXXII, fig. 350).

When simple angle burins are derived from thick flakes or thick blades, or from elongated core-formed pieces, several removals were often carried out forming burins with a more or less irregular polygonal bevel. The truncation can be transverse (pl. XXVI, fig. 95, pl. LXXXII, fig. 351, pl. CII, fig. 474). It can also be very oblique, whether it is formed by a thick edge, or by a fracture, or by means of a desired removal using a coup-de-burin. From a technical point of view, these latter tools are close to Bourlon's prismatic burin; a small number, like the beautiful piece fig. 46 (pl. XVI), resemble the plane burin. But an unsuitable raw

material and a brief modification resulted not only in tools of mediocre quality, but also in accidental and crude forms, which are difficult to compare to elegant tools of the French Aurignacian (pl. LIX, fig. 262, pl. XCI, fig. 398, pl. XCIV, fig. 416, pl. CIII, fig. 476, 477.)

Finally, there is an enormous quantity of simple burins, whose bevels result from two crossed strokes, forming a rectilinear bevel of the flute-nose type. Sometimes, here too, one of the removals is replaced by a thick edge or a suitable fracture, which leads to transitional shapes close to the corner burin. It is very rare that one of the sides is faceted (pl. XXVI, fig. 95, pl. XXXVII, fig. 166); This is never the case for both. These simple burins, many of which, it goes without saying, can be fortuitous, are often derived from flakes, more rarely from blades, with the exception of thick, half-core pieces. A series is reproduced here (pl. 100, pl. LXVIII, fig. 300, pl. LXIX, fig. 303, pl. LXXXVI, fig. 375, 376 et.; for very large flakes, see: pl. IX, fig. 10, pl. XXXIV, fig. 150, p1. XXXVII, fig. 164).

As in the classic sites of Western Europe, we frequently find multiple burins, in varied combinations. We refer to figs. 9 (pl. IX), 95, 98 (pl. XXVI), 101, 102, 105 (pl. XXVII), 258, 259 (pl. LIX), 473 (pl. CII), etc.

If we risked, relying on the material at our disposal, to give typological and chronological details, we would have to say that the definable burin shapes of the Finnmarkian show a fairly close affinity with the Aurignacian. It is difficult to distinguish with certainty Magdalenian forms, although one or two pieces can, from their outline, be characterized as a sort of false parrot's beak, but without dorsal retouches (pl. LX, fig. 267). Simple burins of the flute-nose type or with the angle of a broken blade allow no consideration, because they are found, as we know, in all areas of the Upper Paleolithic.[1] However, the burins are no longer considered a

[1] See: BOURLON, op.cit, note on fig. 2, No. 11.

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typical and irrefutable fossil of the recent Paleolithic. Schwantes made known the burins of the Ahrensburg stadium. Westerby found numerous burins at Bloksberg[1], even polyhedral burins, and would also have noted their presence in the Maglemose civilization, just as in the finds from the kjøkkenmøddings period. Th. Matthiassen, who is currently studying the collections of the Danish National Museum, informs me that these types of burins are found in the kjøkkenmøddings, and similarly, in a sporadic state and in an untypical form, in the Maglemosian civilization.[2] We also collected some, in fairly small quantities, at the sites of the civilization of Fosna, on the west coast of Norway.

A fairly large number of burins must, based on their dimensions, be characterized as microlithic burins (pl. LX, fig. 265−267; fig. 20a and f, fig. 40g-h in the text). With rare exceptions, they are similar shapes to those that we have just studied, above all corner burins with retouched truncation. They generally come from fairly large strips and the work is relatively neat. Some pieces could possibly resemble the Noailles type[3] (pl. XXVII, fig. 103, 105), but without lateral notches. It should be noted that the Tardenoisian microburin was not found at any site.

Retouched blades. Knife blades. — The number of blades naturally varies extremely at the different sites. It is necessary, at least for a good part of the cases, to look for the reason in the rock used, because flint and especially the hornstone break easily and produce blades of good quality, even if the pieces, because of the raw material, cannot be very large. The hornstone sites, such as Prestestua II and Jernbanestasjonen, and the flint sites, such as Tollevik and Steinseng, also offer a fairly characteristic blade industry, although of small dimensions. The other species of rocks used hardly produce blades. A very special exception must be made for red quartzite, which is very usable; at sites like Smellroren it has supplied blades, worked or not, in large numbers and of good quality. As the red quartzite was often in the form of large blocks, the dimensions of the blades are very considerable here.

As the numerous chips on the edges show, the blades were, in their raw state, very often used as knives or similar tools. This mostly happens

[1] E. WESTERBY: Stenaldersbopladser ved Klampenborg, p. 72 etc. Copenhagen 1927.
[2] Letter dated November 19, 1935. The pieces of this type that I was able to find while examining in 1935, at the Danish National Museum, some of the material from the Maglemose civilization and the kjøkkenmøddings, were few in number and presented the character of makeshift burins.
[3] L. BOURLON, J. and A. BOUYSSONIE: Un nouveau type de burin, Revue de l'Ecole d'Anthropologie de Paris. May 1903. − See Bourlon, fig. 2, No. 10

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with the best rock, the hornstone. But also frequently, we observe a marginal retouching of the blade. It can

be more or less hasty, but rarely it is confused with the damage from use; or it is more complete and we have an abrupt unilateral or bilateral retouch, which especially resembles Aurignacian work (pl. IX, fig. 7, pl. XV, fig. 38, 39, pl. LVII, etc.)

Some very thick blades, with bilateral retouches, are reproduced here (pl. LXIV, fig. 285, 286). As in the Aurignacian industry, there are blades − although few in number − with lateral notches, often wide, but shallow (pl. LVII, fig. 240, 246 etc.). We also refer to what we are going to say about the notches in the passage devoted to scrapers. We sometimes observe bilateral notches, forming a sort of groove (pl. XXII, fig. 77).

We have a large number of knife blades with a sharp edge, the other edge being entirely or partially brought down by a retouching that is always very abrupt. It is extremely rare for the dorsal blunting to be carried out on the underside of the blade. On the other hand, there are several pieces where the region of bulb of percussion is modified, on the plane of explosion, by a partial retouch, which is then quite flat (pl. XXXII, fig. 132, 135, pl. LVIII, fig. 247). Sometimes the retouch affects the entire back of the blade, and the result is elongated blades with turned backs, which resemble or are completely identical to the Châtelperron type from the early Aurignacian on the continent[1] (pl. XVI, fig. 42, 43, pl. XXI, fig. 72, pl. XXXII, fig. 132, 134, pl. LVIII, fig. 251, 253, pl. LXIX, fig. 305; fig. 8, 15, 25 and 42 in the text). Similar flint knives of small size, finely retouched, are also found very frequently in the recent Neolithic of the north,[2] but they seem to be missing in the Campignian[3] whose knife blades are much coarser and longer.[4] On the other hand, it is possible that this type was maintained in the flint industry on the continent, where we also see it in the recent Neolithic, and even at different times in the Bronze Age.[5]

In other cases, the retouch only concerns the part of the piece near the end, shaped as a support point for the finger. This more summary modification is also found in the Paleolithic, as in the recent Neolithic of the north.

[1] H. BRELIM: Subdivisions etc. fig. 1, No. 5 etc.
[2] JOHS. BØE: Steinaldersboplassene paa Nappen i Søndhordland (The Stone Age sites of Nappen etc.) fig. 48. Bergens Museums Årbok, 1921−22
[3] In Klampenborg, near Copenhagen, E. Westerby observed thin knives that might resemble ours, but as he does not provide pictures, it is difficult to judge them. E. WESTERBY: Stenaldersbopladser ved Klampenborg (Stone Age Sites of Klampenborg) p. 70, Copenhagen 1927.
[4] SOPHUS MÜLLER: Ordning af Danmarks Oldsager. I. Stenalderen (Prehistoric system of Denmark. I. The Stone Age) fig. 143. − A. P. MADSEN and others: Affaldsdynger fra Stenalderen i Danmark (The kjøkkenmøddinger of the Stone Age in Denmark) Pl. VI, fig. 33. Copenhagen 1900.
[5] Abbot J. Philippe clearly characterizes the samples found with "blades with turned backs of the type of Châtelperron". J. PHILIPPE: Le silex et les roches locales dans les mobilier du Bronze III au Fort Harrouard. Caen 1934.

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Similar small points of the general Châtelperron type often also have the size of microliths (pl. LVIII, fig. 254, pl. LXXXVI, fig. 367, 368, pl. XCIV, fig. 417, 418, pl. LIII, fig . 481, 482; fig. 30 a, b, fig. 31 in the text). All intermediate forms are represented, up to the short and fairly wide points of Abri-Audi type, which we will discuss elsewhere.

It is extremely rare to find blades with unilateral or bilateral retouching, similar to the blades of the Aurignacian Gravette or the small knife blades from the Magdalenian or more recent times.[1] We refer to fig. 6th, from Prestestua:

It is only at Smellroren that we find more or less large blades, with a concave edge and a turned down and convex back (pl. LIII, fig. 219, 221; fig. 28 e, d, in the text). This group is too extensive for the form to be fortuitous, although I cannot draw clear parallels with the other Stone Age civilizations. Moreover, at this site alone, we have all the intermediate types, up to that of Abri-Audi (pl. LIII, fig. 220, pl. LIV, fig. 222; see also pl. LXXXV, fig. 365).

Likewise, we find, in lesser quantities, knife-blades, wide and short, derived from short blades, with one sharp edge, the other edge being retouched or blunted (pl. XXXIII, fig. 143, pl. LXXXII, fig . 347). One or two pieces are completed by a beak or spur at the dorsal part (pl. LXXXV, fig. 364, pl. CII, fig. 470), and should perhaps rather be called scraper-knives.

Finally, we have blades reworked into scrapers, piercers or similar tools that we talk about elsewhere.

Tools for scraping or scraping. − Instruments of different kinds used for scraping or scraping are, in the Finnmarkian, by far the richest group of tools. They are found at all sites, sometimes in quite large numbers and in very varied forms.

We will first mention very large and very heavy tools, which are shaped directly on cobbles, blocks, plates

or pieces of rock; part more or less extended around the perimeter, a side or an angle has been made useful by a rough knapping, while the rest of the piece remains in the rough state or is roughly modified for gripping. A certain number of these tools must without hesitation be characterized as very heavy scrapers (pl. XXXI, fig. 123, on a flat cobble, pl. LXXVI, fig. 325 on a thick flake, pl. X, fig. 17, on a plate). Other tools of the same character, but of medium size, are shown in fig. 56, 57 (pl. XVIII) and 79 (pl. XXII). Others have the character of thick scrapers and can, in shape, resemble the enormous keel scrapers. We refer to the objects figs. 51 (pl. XVII) and 323 (pl. LXXV below), shaped on thick plates

[1] See H. BREUIL: Subdivisions etc. fig. 5, Nos. 1−7, fig. 46.

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of a tight-grained diabase, in addition to that of fig. 60 (pl. XIX), which is retouched starting from the flat lower face and coming from a block of quartz. The piece fig. 320 (pl. LXXXV, compare pl. XXI, fig. 67), formed of a thick plate of quartzite, is roughly cut at the top into a sort of gigantic snout containing two notches, while the opposite edge is roughly modified by transverse removals. In general, we must say that these coarse instruments belong to ordinary types which are found in large quantities at the same sites or in other deposits, with the difference that they have exceptional dimensions. We are therefore not dealing here with original type tools, but simply very large tools made necessary by the requirements of certain jobs. Judging them thus, they have their closest parallels in the "gigantoliths" of the loess sites of Ondratice, in Moravia,[1] shown by K. Absolon and which also imitate many ordinary types.

We frequently encounter tools of about medium size, especially of quartz or quartzite, with a coarse retouch, or rather a size, who indicated them to be real scrapers. There are many variations, sometimes of a semi-fortuitous character. The most common shape is that which has a more or less convex cutting edge, with a unifaced flake that brings them close to the classic scrapers of the Mousterian (pl. XIV, fig. 31, pl. XXX, fig. 117, pl. XXXV, fig. 151, pl. XLVIII, fig. 203, 204, pl. LXIII, fig. 279, pl. LXVI, fig. 293, 294, pl. LXXI, fig. 314, pl. LXXXV, fig. 361, pl. XLIX, fig. 456), although the retouch in scales from the Quina scraper is very rare (pl. XLVIII, fig. 201) and otherwise difficult to obtain with this type of rock. In general, they are very strong instruments. Scrapers of smaller dimensions are rarer (pl. LXXXV, fig. 360; fig. 17 in the text). Then, a common type, as in the Mousterian, is that of double scrapers. Most have one convex edge and one concave edge (pl. XXXVI, fig. 162, pl. XLVIII, fig. 203, 204, pl. XLIX, fig. 208, pl. LXV, fig. 291, pl. XIII, fig. 409, pl. C, fig. 457). The edges of slices and scissors sometimes have this shape (pl. XVIII, fig. 53, pl. L, fig. 210, pl. LXVIII, fig. 299). More rarely, the two edges curve towards each other to form a sort of very heavy point, in a way reminiscent of the ordinary scraper points of the Mousterian (pl. LXVI, fig. 280). Among the single-sided double scrapers, a special type can be recognized; these are very thick pieces that have a projecting edge on the lower face, on the reverse of which is a scraper on each side. The cut of the piece is therefore rhomboidal. In this way, the instruments are easier to handle, although they are not very changed.

[1] Dr. K. ABSOLON: Über Grossformen des quarzitischen Aurignaciens der palaeolithischen Station Ondratice in Mähren. Mitteilungen aus der palaeolithischen Abteilung des Mährischen Landesmuseums. No. 42. Brunn 1935−36. See as an exception, Pl. 42−44, and compare to our fig. 60 (pl. XIX).

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(See fig. 26 in the text; pl. XXIII, fig. 80, pl. LXXXIX, fig. 386, pl. XLIX, fig. 205, which is also cut like a sort of natural scraper, or rather a burin-cutter.)

It is quite common to find scraper-shaped tools resulting from a two-sided cut, as we sometimes also see in Mousterian civilization. Essentially, the same shapes reappear: simple, double, convex and concave contour, or convex on both edges. We show here, among others, a piece that offers the particularity of having a well cleared beak in the middle of the cutting edge (pl. XCIII, fig. 410). Among these scrapers, we find intermediate forms that tend towards bifacial tools (pl. XLIX, fig. 206, 207).

We commonly encounter ordinary end-of-blade scrapers, which appear everywhere in all levels of the Stone Age in Europe, from the Upper Paleolithic onwards. The shapes are ordinary: convex (pl. X, fig. 12, 13 etc.), or concave, sometimes with retouch of the lower face or alternating retouch. In the quartzite industry, there are very robust tools of this type (pl. LXXIX, fig. 339, pl. LXXXIV, fig. 355). Sometimes the retouch has the appearance of an oblique truncation (pl. XXI, fig. 73, pl. CI, fig. 466). Several are microlithic, such as the short characteristic pieces from Tollevik (fig. 40b, c in the text).

Side scrapers on blades are extremely rare.

Next come many simple scrapers, of varying dimensions, with more or less coarse retouching, on the edge of a flake. It is an industry without much character, which offers little other interest than the enormous quantity of pieces. From the point of view of technique and form, these ordinary tools are similar to good blade scrapers. Sometimes they have a retouch of the lower face of the flake, or a sort of two-sided cutting of the edge (pl. XXXVII, fig. 168, pl. LXV, fig. 290, pl. XC, fig. 389). Sometimes thin remains of a core have even been used, or, when it comes to very large and very robust, thick chips. In this number, there may be, by exception, flat circular scrapers, as in the Magdalenian and in later industries (pl. XXXIII, fig. 139). There are also larger pieces (pl. XXX, fig. 118), with alternating retouches (pl. XCV, fig. 423), or with cutting on both sides (pl. LXI, fig. 274). Some have two opposing semi-circular scrapers, one of which is retouched on the upper face on part of the edge, and the other starting from the lower face on the opposite edge (pl. XLVIII, fig. 200).

Truly characteristic and good quality core-form scrapers are relatively rare, although they are more numerous towards the west, of flint regions (pl. XI, fig. 20, pl. LXIV, fig. 284, pl. XCII , fig. 403, pl. XCIX, fig. 452; fig. 15 a in the text); but there are a large number of scrapers made more or less crudely, on the edge of a flat face, in a core-form block or in a thick flake, like core-form scrapers. Likewise,

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it is extremely common for heavily used cores to be transformed into instruments for scraping, by developing a suitable part of the piece. This process is applicable to both discold cores and bladed cores, and is very common in the quartzite industry. The sub-spherical blocks of white quartz that are common in the Kirkenes region, are largely made into a sort of core scraper, by a very rough retouch, starting from a faceted plane that often seems to be purposely prepared. The shape of these tools is not very distinct. Figs. 3, 11 and 16 (in the text) will give an idea.

Our sites have a very considerable number of other thick scrapers of various types; but as these tools have rarely been made with good raw material, we will deal with the uncharacteristic shapes that result from a rough cutting of quartz and quartzite. We have previously, regarding burins, pointed out some tools which, by their shape, are transitional to the very narrow keeled scrapers (pl. LIX, fig. 260, 261, pl. XCVI, fig. 426, pl. CII, fig. 475; see pl. LIV, fig. 224, bottom). In addition we have a large number of pieces that more or less resemble the keel scraper, without however having the technical perfection that distinguishes this tool. The dimensions vary extremely, and range from small single or double microlithic scrapers (fig. 20c in the text) up to medium pieces, often with multiple useful parts (pl. C, fig. 461; fig. 11 in the text, on the left), and to elongated, coarse-cut instruments coming from typical quartzite sites (pl. XLVII, fig. 197, 198, pl. C, fig. 460). At many sites there are also blocks, or thick plates, or large pieces of rock retouched or knapped in a way reminiscent of keel scrapers (pl. XVII, fig. 51, pl. XIX, fig. 60, etc.). One or two of these enormous examples of quartz have been mentioned above.

These thick scrapers present a series of variants that could be called planes, nosed scrapers, etc. But in general, the shapes are not very distinct. We will judge this by the following pieces: fig. 15b, e, and e (in the text); pl. XXXV, fig. 156, pl. LXIV, fig. 283, pl. XCVI, fig. 433, pl. C, fig. 462, etc. It is only when, as an exception, a good quality rock is used, that the shapes are more significant, like the beautiful little nosed scraper from Seilmerket II (pl. XXI, fig. 69), or the piece in fig. 54 (pl. XVIII) of Seilmerket I; this, in addition to a scraper modification of the keel type at both ends, in contact with two different planes, bears on one side a scraper retouched opposite the concave lower face. Similar scrapers with a concave lower face (due to sharpening) are found in limited numbers in other sites, including those with coarse quartzites, although, in the latter case, the execution is naturally more schematic. In fig. 211 (pl. L) of Smellroren we see two cases of this kind, one at the bottom near the heel (fig. b), and the other at the top, near a sort of chopper.

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It goes without saying, moreover, that the limit that separates these various thick scrapers from core-form scrapers is very uncertain.

Let us also point out that there are a certain number of thick, half-core-form scrapers, with a wide and convex useful part, and a more or less fan-shaped retouch, that resembles the Aurignacian retouch, although the poor quality of the rock and rough knapping resulted in mediocre tools (fig. 32b, in the text; and pl. C, fig. 463, pl. CI, fig. 464).[1]

In these scrapers, as in several of the previous ones, it frequently happens that the lower face shows traces of intentional modification, represented by some removals. This modification of the lower face may have taken place before the actual knapping of the flake. In some cases, it is probably fortuitous, and is due to the size of the block or to a missed blow while trying to knap a flake; but in most cases it is undoubtedly

voluntary and serves to make the lower face of the scraper more adapted to its role and sharper. In certain cases, this result is undoubtedly due simply to the sharpening of the scraper, exactly as the keeled scrapers and the core scrapers are sharpened by a removal of flakes made perpendicular to the retouched part.[2] This way of sharpening scrapers is extremely common in Finnmark, and especially, as we understand, when it comes to thick tools. In the heavy quartzite industry, this same technique is cruder and often consists of a single large removal, preceding or following the knapping of the flake, and, in the latter case, before or after retouching with a scraper.

It is also very common for the scrapers to be shaped on the striking plane of the flake, sometimes with retouching of the lower face, and often in such a way as to provide a slightly concave scraper on each side of the bulb of percussion, which forms then a narrow convex scraper (pl. XI, fig. 19, pl. XXI, fig. 74, pl. XXII, fig. 75, pl. XXXIV, fig. 147). It is often very difficult to tell if it is a retouch of the flake after knapping, or if it is the remainder of a retouch of the striking plane of the core, or both at the same time. In the heavy quartzite industry, this retouching is crude and often accompanied by the aforementioned modification of the upper face of the flake (lower face of the scraper). The large blades fig. 195−196 (pl. XLVI, XLVII) from Smellroren were treated in this way, but with complete removal of the bulb.

Quite often, we also find very concave scrapers, with notches, either on blades or on flakes. Well-retouched notches are rare, however, and are found especially in the micro-industry (fig. 6 e, 37c, 40 d, e, 42a). In other cases, they are certainly due to use, or crushing, or a single removal.

[1] See on this subject e.g. H. BREUIL: Subdivisions etc., fig. 6, No. 1.
[2] M. BOURLON: Observations sur la technique, fig. 1. Revue préhistorique, 1908−09. Paris 1909. − See the study cited above by HAMAL-NANDRIN.

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The notches can be fitted to the tip of a blade, like a concave scraper (pl. XV, fig. 36). Sometimes they come in twos and form a snout (pl. XXI, fig. 69, pl. XXXIX, fig. 175), or a pointed beak, almost like a sort of piercer (pl. XXII, fig. 76; fig. 23 in the text). Similar dispositions are observed in other industries of various periods, in any case from the Mousterian,[1] and very generally from the primitive Aurignacian.

In the heavy quartzite industry, notches are often obtained by one or two vigorous blows, made perpendicularly or slightly obliquely to the plane of the flake. We also find thick and elongated flakes that have one or more lateral notches thus obtained, either with complementary cutting (pl. LXIV, fig. 283), or without this cutting (pl. XXXV, fig. 152). It thus happens that the pieces resemble a sort of very thick and coarse strangled blade. These tools are so crude and their notches so blunt that they do not appear to have been very usable.

It is quite different with the gouge, when it was obtained by a very oblique blow on the edge of a flake, or − if this edge was very thick −, by two crossed blows on the same part of the edge, or again by a blow made obliquely on the edge and accompanied by a suitable modification of the opposite face (pl. XCIX, fig. 455). The result was a cutting edge that was often perfectly suited to cutting, but also to scraping bark, wood, or bones, in the same way that a shoemaker scrapes a sole with a piece of glass. This is the most common way of making a gouge in Finnmark. We see it in many flakes, large or medium, and because removal is most often practical on the surface of shattering, it goes without saying that it is a voluntary modification, intended to produce real tools. Secondary retouching is extremely rare and was not necessary. On the other hand, we notice from time to time, as has been said, an appropriate modification of the upper face of the flake, and, naturally, traces of use on the edge. This technique of notching can be seen on many pieces shown here. Such tools and how to obtain them have also been known for a long time on the continent.[2]

It is not uncommon to find several such notches on the same piece. Sometimes, they are obtained by alternate knapping on part of the edge, where the concave and convex parts follow one another (pl. XXIV, fig. 84, pl. XLVI, fig. 194, etc.).

[1] See e.g. V. COMMONT: Moustérien à fauna chaude dans la vaillée de la Somme à Montières-les-Amiens, t. I, p. 297, fig. 3. Congrès International, Genève 1912 (13). H. BREUIL: Le Clactonian fig. 13; Préhistoire, t. I. H. BREUIL et L. KOSLOWSKI: Etudes de stratigraphie paléolithique dans le Nord de la France, le Belguque et l'Angleterre, fig. 7, No. 7. L'Anthropologie, t. XLIV, p. 265.
[2] We refer to "hollowed flakes". reproduced by R. R. MARETT: The Site, Fauna and Industry of the Cotte de St. Brelade, Jersey. Fig. 43−44. Archaeologia, t. LXVII, p. 75 etc.

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Fine piercers, well retouched on the tips of blades or narrow flakes, are very rare (pl. LVI, fig. 238, pl.

LVII, fig. 239). A small, extremely neat tool from Prestestua (fig. 6b) must also be characterized as a drill of a type that could belong to any period after the Magdalenian. On the other hand, we have a certain number of blades and flakes that present a protruding angle arranged in such a way that the piece could serve as a piercer (pl. XCIV, fig. 411 etc.); similarly, large flakes and core-form pieces have a sharpened point. However, their purpose is extremely doubtful. Heavy tools, like the one in fig. 357 (pl. LXXXIV) of Storbukta could be mentioned here, although they are rather analogous to strikers.[1]

Quite a few core-form pieces have, on one of their edges, a beak or a pointed spur, a certain result of a voluntary modification obtained by two or more crude removals, never by a fine retouch. Some characteristic examples are shown here (pl. XL, fig. 179, pl. LXXVII, fig. 328, etc.) resistant.[2] With such tools, one could very well pierce a skin, for example, or a more resistant material. The use of the piece is more doubtful when the spur is thicker or less pointed (pl. XX, fig. 62, 65), or wider (fig. 33, in the text, bottom and right, fig. b). Some of these pieces are not very different from the flakes we have just discussed, with a spur released by two notches, and which would be very suitable for drilling (pl. XXII, fig. 76; fig. 23 in the text). These tools are also sometimes pointed and sometimes blunt.

Along with the piercers, let us also mention some blades of varying dimensions, which show, on one angle, a narrow burin without retouching. Again the piece fig. 9a, probably damaged, shows this variety of tool. In its most characteristic form, this type is quite rare; yet it is represented both by pieces of large size (pl. CII, fig. 470) and by true microliths (fig. 30f, in the text). On the continent, this type is ancient, and archaeologists have given it the French name taraud.[3] In the north, this is probably the first time it has been noticed.

Scissors or scrapers on short blades ("sinew frayers"). A very characteristic type of tool, but whose purpose is not absolutely certain, is shown in the following figs: pl. XCV, fig. 425, pl. CI , fig. 467 to 469 and fig. 39a (in the text). This group is not very numerous, but it is fairly well represented in the Alta flint industry. These are short blades, fairly thick or

[1] For the form of these pieces, see: H. OBERMAIER: Fossil Man in Spain, flg. 82. Newhaven 1925.
[2] A similar piece from Hermannsburg is shown by HANS PIESKER: Vorneolitische Kulturen der südlichen Lüneburger Heide, pl. VII, fig. 3. Veroffentlichungen der urgeschichtlichen Sammlungen des Provinzialmuseums zu Hannover, t. III. Hildesheim u. Leipzig 1932.
[3] A typical example belonging to the Mousterian is shown by D. PEYRONY: La Ferrassie, fig. 16, No. 1; Préhistoire, t. III, p. 17.

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wide, knapped on these short cores, with a very oblique striking plane, which are very common in the region. The tools are truncated or retouched transversely at the base, sometimes also at the opposite end of the blade. The retouching is always carried out on the lower face of the blade and each time is accompanied by an modification of the upper face, by longitudinal removals, before or after knapping. Sometimes the retouching is so crude that the pieces almost have the character of scrapers, analogous to the "sinew frayers" of Mr. Leakey that were noted for the first time in the Aurignacian of Africa.[1] In other cases, the cutting edge is quite thin and the pieces are more like scissors (pl. LXXXII, fig. 352, at the bottom, pl. CI, fig. 468; fig. 39a). Finally, the blade sometimes bears a sharper retouch at one of the ends, and flatter at the other. These are undoubtedly pieces of the second type that the abbot Mr. Breuil noted in large quantities at Predmost[2] and they seem to be well represented in Eastern Europe.[3] Mr. Breuil cites on occasion chipped pieces from the same cultural background, but as a special form, a "systematic type". In Finnmark, these tools are certainly of a separate type, which has little in common with the chipped pieces.

In Storbukta especially we find a few small short gouges similar to the previous ones; but their edge is generally formed by a single oblique removal on the upper face of the blade (pl. LXXXVII, fig. 377, 378), rarely by retouching. In both cases, the edge is very sharp and the piece must be characterized as a true gouge. In one or two cases the edges of the blade are retouched in the vicinity of the gouge which forms a sort of burin beak (fig. 34c). Is this result intended? This is not certain, because the retouching may be prior to the removal that produced the gouge. Moreover, in one case, this tool is combined with knapping of coup-de-burin.

Shuttles. Exceptionally we see a piece appear (pl. XXIII, fig. 81) coming from a flake cut on one edge and bearing a notch at the tip that was probably used for fixing or gripping. It can only be a saw to notch or a shuttle.[4] Certain tools (see pl. XXIV, fig. 86), although they do not have the point of a notch, probably had a similar purpose. The parts fig. 84 and 85 of the same plate have an external resemblance to the previous one, but

[1] L. C. B. LEAKEY: The Stone Age Culture of Kenya Colony. Cambridge 1931. − According to the

information I have from the abbot Mr. Breuil, this form is also found in Europe, but is not yet mentioned in scholarly works, and it is doubtful that it can characterize a specific cultural horizon.
[2] H. BREUIL: Voyage paléolithique en Europe centrale. L'Anthropologie, t. XXXIV, p. 529.
[3] See L. SAWICKI in Przeglad Archeologieczny, t. III (1926), pl. V, fig. 32.
[4] For the form, compare: E. OCTOBON: Navettes-Grattoirs à encoches symètriques et pièces qui les accompagnent dans les industries à quartzites des pays toulousains. Congrès préhistorique de France, XIème session 1934. Le Mans 1935. − D. PEYRONY: Etudes de formes inèdites ou très peu connues du Moustérien etc, fig. 1, No. 1−2. Revue Anthropologique, 1925.

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their edge is not retouched, although it bears chips due to use. However, there can be no question here of probable fixation, because these two pieces have a heel adapted to various forms of tools.

The piece fig. 308 (pl. LXX) − a thin flake that is finely denticulated on an edge − is obviously a kind of saw. Such tools are also extremely rare. From time to time, however, we observe an irregular and rudimentary denticulation on blades and on small flakes, without it being possible to indicate the purpose.

Chipped pieces. Many of the pieces found in Finnmark are flaked or chipped pieces, of a character that we know from the Aurignacian and later civilizations. The best are shown here (pl. XXIX, fig.111, pl. LX, fig. 268, pl. XCII, fig. 400−402). Most of these pieces is more or less atypical and sometimes they are real waste. They are composed, in the majority, of blocks of reduced dimensions or of core-form pieces, with irregular removals on one or both sides, at one end or at both. In addition, there are relatively thick flakes that are obviously unsuccessful removals from small cores of this kind, while the real blades and the slats are only rarely treated in this way. The pieces of these last two groups are most often only knapped on one side. This material is almost exclusively made of flint or hornstone, and is only found in fairly large numbers at sites located outside regions where these kinds of rocks are abundant, particularly in Storelva and further east. However, they are found at the Bossekop I site, in the Alta flint region. They played a role in the archaeological literature, in the study carried out by Bardon and Bouyssonie.[1] the abbot Mr. Breuil has the merit of having shown that they do not particularly characterize the Aurignacian period, as is assumed, but that they are found in strata that range from the Aurignacian to the Azilian,[2] in regions poor in high quality raw material. Sporadically, they have been observed in the region from Scotland to at least Siberia.[3]

That these tools can be explained by the lack of raw material and the almost total exploitation of the core is confirmed by a general knowledge of the sites

[1] Tool scaled for percussion. Revue de l'Ecole d'Athropologie de Paris, 1906, p. 170.
[2] In Finnmark, they are still found in very recent Neolithic sites, and even at a later period (p. 213).
[3] H. BREUIL: Observations on the Pre-Neolithic Industries of Scotland, p. 226. Proceedings of the Society of Antiquaries of Scotland, vol. LVI, 1921−22. The same author: Voyage paléolithique en Europe Centrale, p. 528 . L'Anthropologie, t. XXXIV. 1924. − G. SOSNOVSKY: Die paläolithischen Stationen des nördlichen Asiens. Pl. III, fig. 14. (Afontova Gora). Transactions of the Second International Conferance of the Association on the Study of the Quaternary Period in Europe, fascicle V. Leningrad−Moscou. 1935. This must also contains pieces of the type that Eflmenko shows, from Kostienki I, under the name: "Klingen primitiver Äxte" (P. EFIMENKO: Die paläolithischen Stationen der osteuropäischen Ebene, pl. III, fig. 7−8. − The same publication.)

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from Finnmark. It is indeed very significant that we do not find them in the region of Kirkenes, at Jernbanestasjonen (No. 7), where we have found an abundance an excellent hornstone. It even seems that we have reason to wonder if these pieces are, as has always been believed, real tools, or if rather the sharp scales do not have a fortuitous origin due precisely to the extreme use of small cores of flint and hornstone. Because the knapped edges are not always sharp. Sometimes they are not sharp at all, but blunt and quite thick (pl. XCII, fig. 402b where the piece is seen from above). In the cases of this kind, we have some doubt and we can very well assume that the knapped edges are the result of blows made while trying to cut the blades. As to whether these sharp edges, once produced, were usable for example as scissors, after fitting to a bone or antler, is a whole other question.

Microlithic tools. In most sites, there are samples from an industry which, based on the size of the pieces, can only be characterized as microlithic. In no way can it be compared to heavy quartzite industry or medium flint and hornstone tools. And when it comes to the number of pieces, the difference is almost always very considerable. At most one or two were found in each site; by exception (Steinseng, Tollevik, Seilmerket, Berlevåg) we arrive at a dozen real tools. The flint and hornstone cores that have been preserved, and served

as a starting point for the microlithic industry, are not very rare (pl. XXXV, fig. 155, and fig. 6 f in the text), but they are extraordinarily small. We commonly find some that measure only 0.02m in length or even less. Obviously, one uses then long as possible. Let us also remember that the small cores with flaked ends are quite numerous. It is clear that such small cores could only − at least at an advanced stage of their use − provide tiny blades and flakes, and and what confirms this is that the flint and horn waste collected at a number of sites are of very small dimensions. It is therefore very possible to admit that the micro-industry was, at certain sites at least, a little, or even much richer than the findings suggest. We can also admit that over time, such small objects could have slipped into the patch of large beach cobbles on which − and sometimes in which − the archaeological pieces rest, and consequently, more easily escaped being found.

On the other hand, from the point of view of forms, this category of objects is extremely poor and monotonous. Well-defined geometric shapes, triangular, scalene, half-moon, trapezoid, etc. are completely absent. The short blades with oblique terminal retouch of Tollevik (fig. 40b, c in the text) cannot fit into this group. They have retained their bulb percussion and are rather

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a sort of scraper knives. We can no longer point to a few blades with dorsal retouch, which offer a certain fortuitous resemblance to small half-moons (fig. 14g), or to other blades with blunted edges, which following a secondary fracture, have taken on the false appearance of a triangle (fig. 14h, 20g). This is all pure chance. Likewise, and despite the most careful sorting of the mass of pieces, we have not found a single sample of a Capso-Tardenoisian microburin, geometric shape that everywhere accompanies the microlithic industry.

The types of tools found in the microlithic industry of Finnmark are on the whole those found in the larger tool industry, and they are distinguished from these only by their very small size. We show a very limited selection of small burins (pl. XXVII, fig. 103, 105, pl. LX, fig. 265 to 267, pl. LXXXII, fig. 350; and fig. 20 a, f, fig. 40 g, h, fig. 42 c in the text, etc.); small scrapers: blade scrapers or thick scrapers, sometimes keeled (fig. 20 b-e, fig. 37 b); notched slats (fig. 40d, e). In addition there are quite a large number of strips or small flakes with blunting or dorsal retouches, of such dimensions as should be cited here, but of the same shape as the larger pieces of the general type of Abri-Audi (pl. LX, fig. 269−271 et.); and small bladelets with curved edges by retouching dorsal, of the same shape as the large tools (fig. 28e, d). In addition, a small number of bladelets with turned backs roughly resemble small Magdalenian knife blades, and yet this resemblance is most often misleading, because they are in reality small tanged arrowheads.

In total, and as far as I can judge after examining all the sites, there are only two pieces that we can strictly call geometric flints. One, fig. 42e, is a small piece of blade, broken transversely and roughly retouched on a single fracture. Its purpose is uncertain; it would resemble the small Campignian arrowheads, with a transverse edge, if it did not have an extremely fine retouch on the edge.[1] The other is a small elongated and rhomboidal point, well retouched on the two truncations (pl. CIV, fig. 495). It is a type known in the "flint sites" of the west coast of Norway.[2] In Finnmark, as has been said, this sample is unique.

One or two other unique pieces should also be mentioned. The first is a small biface, with a rhomboidal outline, and not very thick (pl. XVIII, fig. 55). It is well cut on both sides with a flat retouch resembling the "Proto-Solutrean" retouch and Neolithic knapping. It was impossible to discover good

[1] The proof that one should not attach great importance to these external resemblances, especially when it concerns a single piece, is that Moustier showed "transverse-edged arrowheads". Peyrony says that we would take them for "Robenhausians if they were collected on the surface". D. PEYRONY: Le Moustier, p. 39 etc., fig, 16, Nos 8−11. Revue Anthrologoique, 1930.
[2] See H. SHETELIG: Primitive tider i Norge, p. 72, No. 1.

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examples of this piece, although one can naturally find in the Proto-Solutrean industry forms that faintly resemble this one,[1] and which, on the other hand, the Solutreen has sheets of equally modest size.[2]

A sort of "Proto-Solutrean" retouch is also observed on a very small number of points on blades (fig. 34 a),[3] and on an interesting small point (fig. 40f), where it was used to create a sort of small, fairly flat burin beak.

Only the small tanged arrowheads are encountered a little more frequently at our sites. No doubt they are not very numerous, 20 to 30 at most per site, but they are found almost everywhere where good rocks, such as flint and hornstone, were used. On occasion too, they were naturally knapped from quartz and quartzite. As they are found almost everywhere, we can see them as one of the characteristic types of small industry in Finnmark.

These points offer two main varieties. One consists of a slat or a small chip, with a tang, most often

obtained by bilateral retouching of the lower face. The leafy part, as a general rule, is not retouched, or it can be slightly adjusted along the edge or at the end (pl. XCIV, fig. 419, 420). Sometimes this last retouch is more complete and the point takes the shape of points with a blunted edge or oblique truncation, which we will talk about later. Moreover, the leafy part has some form, often that of a narrow, unretouched blade. A selection is reproduced here (fig. 22a, 40a; pl. LX, fig. 272, pl. LXXVII, fig. 331, pl. LXXXVI, fig. 373, 374, pl. XCIV, fig. 419, 420, pl. XCVI, fig. 430, pl. XCVII, fig. 442, 443, pl. CIV, fig. 491, 492).
In the second main variety, the leafy part has one sharp side while the other edge is blunted and forms a back, straight, curved, or oblique (like an oblique truncation). The tang is usually formed by a retouching of the two edges, which sometimes is not very apparent. We thus find all the intermediate forms, from the blades which give a false impression of Gravette blades or tiny knife blades (fig. 28a, 31a; pl. CIV, fig. 489, 490), up to the atypical notched points (fig. 14e, f, 20d, 30g). Others have, as a result of accidental retouching, a sort of oblique truncation (fig. 14d, 20h, 35c). It should be noted that these two main varieties are mixed in the same sites, that the forms are not always very distinct, and that we move from one to the other by insensitive transitions. In reality, it seems that it was above all the blade or the flake chosen that decided the character and the extent of retouching, although, for certain pieces too, the form is undoubtedly intentional (fig. 30g; pl. XCVI, fig. 429, pl. CIV, fig. 489, 490).

[1] See e.g. L. SAWICKI: Matéraux à la Préhistoire de la Russie, pl. XIX, fig.17. Przeglad Archeologiczny, t. III, Poznan 1928.
[2] See for example A. VAYSON: L'etudie des outils en pierre, fig. 4, Nos 3−4. L'Anthropologie, t. XXXII, p. 15.
[3] See on this subject, for example SAWICKI: Matéraux etc. Pl I, fig. 4−5 de Kostienki. Przeglad Archeologiczny, t. III, Poznan 1927.

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Let us focus on two of these pieces (pl. CIV, fig. 493, 494). These are points with a very characteristic triangular leaf, and a well-retouched tang. As the edges of the leafy part are also finely retouched, it seems that it is a desired shape, which moreover appears very enlarged in the heavy quartzite industry (pl. XXVI, fig. 91, pl. XXXII, fig 130, pl. LXXXI, fig. 343, 344). Similar arrowheads are also represented in the Fosna civilization, on the west coast of Norway.[1] It is one of the main types of meager finds that are united under the name of Lyngby civilization.[2] They also appear in the final Aurignacian.[3]

Moreover, the simple tanged arrowheads are an extremely simple type of tool that may well have appeared spontaneously at very different times and at very different places. It is also very widespread and has proven to be very long-lived. Points with nascent tang are found sporadically in the Mousterian[4] and simple points with unretouched leaves, like those from Finnmark, exist both in the late Magdalenian of France[5] and at the sites of central[6] and eastern Europe, with Proto-Solutrean and later industry[7]

In the north, they are sometimes observed at flint sites on the west coast,[8] and very sporadically at sites from the kjøkkenmøddings period, but very frequently in the recent Neolithic. In Norway, they are considered a characteristic type of this period, and are named after the site of Garnes, located just east of Bergen.[9]

Among the sites of northern and central Europe, where similar points appear, two are of particular interest, because these pieces are found there with small tanged arrowheads, with retouching of the leafy part, exactly as in Finnmark. These are the sites of Ahrensburg in Holstein and Chwalibogowice in Poland, well known from the publications of G. Schwantes

[1] A. NUMMEDAL: Nogen primitive stenalderformer i Norge, fig. 1. Oldtiden IX (1922) p. 146.
[2] See the excellent presentation by G. SCHWANTES: Nordisches Paläolithikum und Mesolithikum. Mitteilungen aus dem Museum für Völkerkunde in Hamburg, t. XIll. Hamburg 1928. By the same author: Geschichte Schleswig-Holsteins, t. I. See also G. ECKHOLM: Lyngby-Kultur. EBERT: Reallexikon t. VII.
[3] H. BREUIL: Subdivisions etc., fig. 12, No. 4.
[4] D. PEYRONY: Etudes de formes inédites ou très peu connues du Moustérien etc. Fig. 5, No. 2. Revue Anthropologique 1925.
[5] H. BREUIL: Subdivisions etc., fig. 44.
[6] See the classification of arrowheads in J. ANDRÉE: Beiträge zur Kenntniss des norddeutschen Paläolithikums und Mesolithikums, p. 82. Mannus-Bibliothek, t. LII, 1932.
[7] See e.g. MICHEL ROUDYNSKY: Sur la question du "Mésolithique" en Ukraine, p. 87, fig. VI, 20−22. Académie des sciences d'Ukraine. Laboratoire d'Anthroplogie de Th. Vovk. Annuaire du laboratoire, 1927. Kyiv 1928. − LUDWICK SAWICKI: Matériaux à la Préhistoire de la Russie, pl. XIX, fig. 3. Przeglad Archeologieczny, t. III. 1927, Poznan 1928.

[8] A. BJØRN: Træk av Søndmøres stenalder (Remarks on the Stone Age in Søndmøre), fig. 11. Bergens Museums Årbok 1919−20.
[9] A. W. BRØGGER: Stenalderbostedet ved Garnes (The Stone Age site of Garnes). Bergens Museums Årbok 1913. A selection of arrowheads is shown in the same study, p. 18, fig. 11. − The Narestø site, where the piece shown by SAWICKI (Przeglad Archeologiczny pl. XXV, fig. 61), belongs precisely to this period.

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and L. Sawicki.[1] In Ahrensburg we find them in quantity, with the leafy part unretouched, mixed with small retouched arrowheads.[2] But the latter belong to a fairly distinct type, with oblique retouch on the leafy part of the blade, therefore with an oblique truncation, sometimes even concave, that only appears rarely in Finnmark. Let us also remember that the Lyngby points belong to this cultural group. In Chwalibogowice, according to the reproductions,[3] it seems that the forms are much more varied and of a more fortuitous character. Besides the simple arrowheads without retouch at the end, and which resemble the types of Châtelperron and Gravette, we also find some with oblique truncation, with a sloping back or almost straight, etc. At this last site especially, it seems to us that there are all the varieties of forms that characterize the small-scale industry in Finnmark. As for the conclusions to be drawn from this resemblance with regard to Finnmarkian, we will return to it later.

Conclusions

Whether it is a question of tool shapes or technique, Finnmarkian is singularly heterogeneous. Overall, we can say that it is composed of two elements, a lighter industry of blades, to which is added an industry which, for its dimensions rather than for its character, it is appropriate to call microlithic.

Later, we will have to look for the signs of Finnmarkian in other Stone Age cultural groups in Scandinavia and Northern Europe. For now, we will just say that Scandinavia itself possessed, at least since the Mesolithic, a fairly elegant blade industry, so this aspect of Finnmarkian seems less surprising. Naturally, the blade industry must offer close resemblances everywhere, despite distances in space or time. And in reality, the Finnmark industry, compared to any other blade industry, offers few characteristic features. We find there the ordinary size of an elongated core (prismatic, conical or more or less rectangular), from which were knapped blades by percussion or by pressure. Blades, which are tools in themselves, also provide the raw material for highly important specialized tools: knives, points, scrapers, burins etc., which are obtained by retouching the blade. It is a technical process that is not unknown in archaic periods, but which took its full development with the typical Aurignacian civilization and its beautiful and rich blade industry. Since then, this technique has always been maintained,

[1] G. SCHWANTES: Nordlishes Paläolithikum und Mesolithikum. Festschrift zum funfzigjahrigen Bestehen des Hamburgischen Museums für Völkerkunde. Mitteillungen aus dem Museum fur Völkderkunde., t. XIII, Hamburg 1928. LUDWICK SAWICKI: L'industrie swidérienne de la station Swidry Wielkie I Przeglad Archeologigiczny, t. v. I, Poznan1935.
[2] G. SCHWANTES: Abb. 16 and p. 189.
[3] See SAWICKI, op.cit, pl. XXII.

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especially in places where flint is abundant. Periods of decline occur, following a need for new tools, which is, to a certain extent, the case during the Campignian period of northern Europe, with its heavy and crude industry. But in the recent Neolithic, we find a careful technique of retouching, which often resembles that of the Upper Paleolithic and which is frequently linked to tools of an exactly similar type (knife blades of the Châtelperron type, scrapers). So, from a technical point of view, the industry of blades is not very characteristic, except that it makes the transition with the upper Paleolithic or certain later periods. And in the Finnmark blade technique, there are few particular features that allow close relationships to be established with this or that civilization group.

On the other hand, the flake industry is much more foreign to northern environments. What distinguishes it is the use of discoid cores or more or less prepared blocks, from which fairly large flakes are produced by percussion, which are, like the blades, ready-made tools, or also semi-finished products from which can be made, through modification, types of special tools. The flake industry and the technique associated with it belong, followed an ancient conception, especially to the Mousterian period of Western and Central Europe, although H. Breuil divided it into cultural series, the oldest of which would be the Clactonian.[1]

However, in the Finnmarkian civilization the knapping is undoubtedly neither Clactonian, nor Levalloisian, nor Mousterian. It is above all a knapping process that adapts to the raw material that was used and to the form in which this material was available. There is thus a knapping starting from a level striking plane, sometimes very oblique, like that of the Clactonian, and, on the other hand, a cutting of the Moustero-Levalloisian. These processes coexisted at the same worksite, sometimes even on the same core. But overall these features − like the very use of the splinter, the ordinary retouching of the splintering plane and the frequent removal of the bulb − connect, it seems, the Finnmarkian to the ancient industries of flakes which, in western and central Europe, ceased about at the end of the Mousterian period and whose existence has not yet been proven in Scandinavia.

The same heterogeneity is observed in all of the tools considered as characteristic of this or that cycle of civilization, and this goes without saying, since the shapes of tools are the primary element which conditions, in reality, the processes techniques. Here we have, on one hand, a clade industry of rather large dimensioned fragments. These are large retouched flakes which are tools in themselves, and also special tools shaped on flakes: scrapers, points, sometimes very crude tranchetx and burins, types which can undoubtedly appear accidentally

[1] H. BREUIL: Le Clactonien. Préhistoire, t. I, p. 193.

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in another environment, but which still characterize Mousterian civilization. Although they are relatively rare, let us also point out the punch-shaped tools that appear at certain sites and accompany this big industry.

On the other hand, we see a series of tools which, based on their character, should belong to a completely different environment. These are, for example, light burins on blades or on medium flakes, retouched blades, knife blades, scrapers, chipped pieces and small tanged arrowheads. It is a set of tools that has its roots in the Aurignacian, but of which certain elements continue to exist much later, and which perhaps suffered the influence of other civilizations. We are thinking here, in particular, of the small arrowheads. Among these, the variety whose edges are not retouched, is perhaps before the Magdalenian, and, perhaps also, a original product of Finnmark. Assuming that it is not originally FInnmarkian, the parallel variety with retouch on the edges can hardly be older than the pre-Tardenoisian of the south of the Baltic Sea, although it is found in certain civilizations of an Aurignacian character.

Regarding this general Paleolithic character, we must recall the large number of multiple tools that we see in the Finnmarkian. They exist both in the coarse quartzite industry and in the lighter flint and hornstone stone industries. This fact is therefore independent of the raw material and its more or less abundance, but must be a constant feature that has not been noticed so far in the Stone Age in Scandinavia, although it characterizes the Paleolithic. Most combinations of this industry are found here too: multiple scrapers, double or multiple burins, scrapers-burins, burin-burins, scrapers-burins, etc.

On the other hand, we must never forget that some of the Finnmarkian tool types, even if they are of ancient origin, are found in more or less recent periods of the Stone Age of the Scandinavian peninsula. This is the case especially for knife blades of the Châtelperron type and simple arrowheads with unretouched edges, slicers, and sometimes also other types. We must therefore admit as theoretically possible, that Finnmarkian tools involve contributions relating to even very recent cultural complexes. We add to this the hypothesis of a delay in civilization, which is not absurd when it comes to the Stone Age in such a peripheral location, in the extreme north of the European continent.

These are data that must, naturally, be studied without prejudice. A good method will be to compare the Finnmarkian to the civilization groups known inside or outside the limits of Scandinavia and which can allow us to discern the similarities and differences here. But, to have a useful basis, it will first be necessary to find out what the age of this civilization could be, in Finnmark itself. We will try, in the following pages, to specify both the moment of its appearance and its subsequent evolution.

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HOW FAR BACK WAS THE FINNMARKIAN?

Geological conditions and geochronology. Character comparison and relative age of the sites. Absolute chronology.

When a Scandinavian archaeologist devotes himself for some time to the study of the Finnmarkian, he cannot avoid a very strong impression: it is that he is dealing with an unknown civilization, very old even if we refer to the ordinary data of science. But, as we will see, according to the examination that we have

undertaken, neither the technique nor the selection of tools provide useful points of support when it comes to specifying this age; at most we can say that this civilization presents a certain mixed Paleolithic character, and that it is either contemporary with the Moustero-Aurignacian, or more recent. But how much more recent? This is what is very difficult to specify. Finnmark is in fact at the extreme periphery of civilizations whose northern limit until now was fixed at about 55º north latitude, and the probability is very high of a delay of civilization as we move further away from south to north.

However, the study of the tools alone seems to allow us to say that the Finnmarkian can hardly belong to the age of polished stones, because the technique of polishing is completely unknown in its sites, while it is common in the other Finnmark sites with a well-established Neolithic inventory. The ignorance of hammering and the absence of the pickax seem to indicate that the Finnmarkian was not exposed to the influence of the Campignian, although the tranchet is common to both groups of civilization. Similarly, we note that geometric flints of Tardenoisian character are not found in Finnmark in the microlithic industry.

Our uncertainty, when it comes to fixing the absolute age of the Finnmarkian, is increased by the lack of stratigraphy of the sites and the total absence of fauna.

Under these conditions, it will be appropriate to investigate what assistance an auxiliary science such as Quaternary Geology can bring to the solution of the problem; In addition, it will be necessary to briefly explain the possibilities that the coast of Finnmark once offered for the stay of man. Naturally, there can be no question here other than that of a short general presentation intended for prehistorians, and we will refer to the special works, for a more complete study.

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The most restricted limit that can be assigned to the stay of man, as in all of northern Europe, is the time of complete glaciation of the country. This does not mean that we only mean the glacial period, responding to the Würmian (or Meeklemburgian) period of the continent. On the contrary, there were geologists and biogeographers to assert, not only that more or less large areas of land have not been affected by this glaciation, but that perhaps certain regions of Finnmark were never even covered in ice. This is how, for de Geer, large areas along the coast of Finnmark were free of ice during the last glaciations[1]. Ramsay arrives at the same result, by trying to parallelize the shorelines on the coast of the Arctic Ocean, from Finnmark to Russia.[2] Previously, this opinion had won over, little by little, quite a few supporters.[3]

However, the Finnish geologist V. Tanner, following studies carried out on the field, arrived at exactly opposite conclusions[4]. For Tanner, we cannot doubt that the ice, during the last glacial period, covered the entire territory where our sites are located[5] and even extended a little into the sea, without being able to say how far.[6]

The botanists, however, have strongly objected to Tanner's theory. Very recently, Rolf Nordhagen, in some works where the richness of ideas agrees with the force of the expression, has maintained that certain elements of the flora of Finnmark must be vestiges of the last interglacial period or of

[1] GERHARD DE GEER: Om Skandinaviens geografiska utveckling efter istiden (The geographicic evolution of Scandinavia after the Ice Age.) pl. 2. Stockholm 1896.

[2] W. RAMSAY: Über die geologische Entwicklung der Halbinsel Kola in der Quartärzeit; p. 109. Fennia, t. XVI, No. 1. Helsingfors 1900.

[3] Let us cite, for example, the assertion of W. C. BRØGGER. "As we have seen, there are several reasons to believe that fairly large areas of Finnmark were not covered during the last glaciation". Om de senglaciale og postglaciale nivaaforandringer i Kristlaniafeltet (Level changes in the late glacial and postglacial of the Kristiania region), p. 10. Norges geologiske Undersøgelser, No. 31. Christiania 1900 and 1901.

[4] V. TANNER: Studier over kvartärsystemet i Fenno-Skandias nordliga delar. I. Till frågan om Ost-Finmarkens glaciasjon och nivåförändringar. II. Nya bidrag till frågan om Finmarkens glaciasjon och nivåförändringar. IV. Om nivåförändringarna och grunddragen av den geografiska utvecklingen etter istiden i Ishavsfinland samt om homotaxin av Fennoskandias kvartåra marina avlägringar. (Studies on the Quaternary system in the northern parts of Fenno-Scandinavia. I. On the glaciation and changes of levels of eastern Finnmark. II. New research on the glaciation and changes of levels of Finnmark. IV. On the changes of levels and the fundamental features of the geographical development after the ice age of Finland on the confines of the glacial ocean and on the homotaxy of the marine Quaternary in Fennoscandia (with summary in French. Bulletin de la Commission géologique de Finlande, III, IV, and XIV. Helsingfors 1906, 1907, 1930. We will henceforth refer to the studies by the abbreviations: TANNER 1906, 1907, 1930.

[5] A complete summary of the question and related works can be found in TANNER 1930, p. 376 etc.

[6] TANNER 1906, p. 155. See, in the same study, the probable limit of the ice slope (pl. 6, fig. 2). TANNER takes up and clarifies those in his last work (1930)

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last previous periods.[1] These "interglacial winterers" could have survived the last ice age in refuges on the coast, that is to say in places free of ice which should be sought at the mouth of Altafjord, Porsangerfjord and on the north coast of the Varanger Peninsula. Following research made in the field, Nordhagen maintains that there were fairly large areas free of ice, especially at Magerøya (where the North Cape is located, fig. 1) and in the islands of western Finnmark (which are outside the area of our sites); On this subject, he formulates strong criticisms against Tanner's research and conclusions which, according to him, must be corrected on several important points.

The contribution that Nordhagen, in the name of botany, makes to the discussion of the problem, cannot be neglected. For us, however, the question is not so much whether there are modest lands free of ice, where the remains of an impoverished arctic flora could lead a precarious existence, as whether, in these regions, there were quite large expanses free of ice, whose fauna and the climate could have made the stay of man possible. It is worth recalling here that modern geologists, in general, seem to agree with Tanner in admitting an almost complete glaciation. Thus, Professor O. Holtedahl, after research carried out in Finnmark for many years, concluded that no reliable evidence allows us to affirm the existence of ice-free land during the last ice age, and this is the same result reached by Mr. Marthinussen who, several years in a row, studied the shorelines of Finnmark.[2] However, according to the latter, it would perhaps be necessary to make reservations for certain high – and very small – parts of Magerøya and the peninsula of Nordkyn (east of the mouth of Laksefjord); on the other hand Mr. Holtedahl has previously shown that it is undoubtedly necessary to admit an uncovered foreland located at the very north of the Varanger Peninsula, even if this foreland only belongs to an ancient stage of ice melting after the maximum of the last glaciation.[3] Finally, outside the area of our sites, it is still possible that the ice did not cover fairly large areas of western Finnmark and the province of Troms. Up to a certain

[1] ROLF NORDHAGEN: De senkvartære klimavekslsinger i Nordeuropa og deres betydning for kulturforskningen (The climate changes at the end of the Quaternary period and their significance for the study of civilizations). Institutt for Sammenlignende Kulturforskning, Serie A XII, Oslo 1933. − By the same author: Om Arenaria humifusa Wg. og dens betydning for utforskningen av Skandinavias eldste floraelement (Arenaria humifusa and its importance for the study of the oldest elements of flora in Scandinavia). Bergens Museum Årbok 1935. Naturvidenskapelig Rekke No. I. (Physical and Natural Sciences Series, No. 1).
[2] Oral information provided by Professor Holtedahl and M. Marthinussen. I thank them both very warmly for allowing me to expose here their point of view.
[3] OLAF HOLTEDAHL: Some remarkable features of the submarine relief on the north coast of the Varanger Peninsula. Avhandlinger utgitt av Det Norske Videnskaps Akademi i Oslo (Studies published by the Norwegian Academy of Sciences) I. Mat.-Naturv. klasse, 1929. No. 12. Oslo 1929.

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Fig. 43. Elevations of the Alta sites in relation to the main levels of Tanner. For the numbers of the sites, see figures 1 and 36.

point, the results of geological research therefore agree with the assertions of biogeographers, but they almost exclude the possibility of a stay of man on exposed land during the peak of the last glaciation in our zone or interest. Thus, according to the unanimous opinion of modern geologists, we must accept the eastern part of Finnmark as covered by an enormous sheet of ice that extended to the sea or even into the sea, so that our sites could only be established during or after the melting of the ice.

As for the very process of melting and the changes that have occurred for the land and the sea, we can summarize them as follows, according to Tanner: under the influence of a milder climate, the mass of the ice decreased, and with continual oscillations withdrew from the coast towards the interior. This melting was faster in the north and to the east on the Varanger Peninsula, and quite early the whole coast of Finnmark was free of ice (Tanner 1907, pl. VI, 2). The sea, whose volume had increased by the melting of glaciers, then gradually covered the regions previously occupied by ice, first the very edge of the coast, and later, as the melting of ice allowed it, penetrated further into the interior. At the maximum height reached by the sea at different places, it formed terraces and shorelines that consequently mark the extreme limit of marine transgression at the place considered. These shorelines still exist at certain places and one can measure them. We then see that − as a result of the isostatic movements of the Earth's crust, which we are going to talk

about − their elevation is generally higher on the coast in the places where the ice disappeared earlier, but lower towards the interior, where the shorelines were formed at a later period.[1]

The extreme limit of marine transgression is therefore not a uniform phenomenon, and as we do not know the rapidity of the melting of the ice at different places, we must be careful, as we have been, to establish a constant relationship between its elevation and that of our sites. In this regard, in our calculations we can only use the shorelines that were formed during a single limited period and that are essentially due to the same causes, that is to say, to the action of the sea on the shore at a time when the entire region of our sites was free of ice.

[1] See the diagram of TANNER, 1906, pl.IV, No. 2.

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Fig. 44. Elevations of the Porsanger sites in relation to the main levels of Tanner (indicated by the bold lines) For the site numbers see figure 1.

Freed from the pressure of the ice, the land began to lift. This isostatic movement was in any case more pronounced than the eustatic rise of the sea, so that the shorelines that formed before the uplift of the land was completed, now appear more or less elevated above sea level. Furthermore, the uplift of the land was less significant at the edge of the coast, but always more pronounced as we advance towards the interior, where the layer of ice was thicker and therefore had exerted a stronger pressure. The shorelines that were formed at the same time, before or during the uplift of the land, therefore do not present a horizontal line, but a line which rises from the coast towards the interior of the fjords. This oblique arrangement is more pronounced for the oldest shorelines than for those which have been known for almost 100 years, and it was first observed at Alta (sites 56−61) by the French physicist Brallais in 1838−1839. Even if we can say that, on the whole, the uplift of the land occurred in a regular manner, it nevertheless underwent more or less long stops, with regressions or transgressions of the sea, which allowed it to leave its traces on the rock or on the soft terrain of the coast. This is what we see in the forms of shorelines, beaches, and terraces, all along the coast and in the fjords of Finnmark, and what has been studied in detail, especially by Tanner and Marthinussen.

Our task is to find out if we can establish a relationship between our sites and some of these levels, and if so, what this relationship is. From what we have just said, the extreme limit of marine transgression is not a usable element, because it is not a constant phenomenon. On the other hand, special attention must be paid to another main level, more recent than the earlier one. It must have appeared after the icecap had retreated beyond the ends of the fjords, perhaps leaving valley glaciers in some of these fjords and even towards the coast in a few places. This level was therefore formed throughout the region that interests us, towards the start of the land's uplift. This is Tanner's Iε level, or line f of his diagrams.

Another constant phenomenon − and therefore useful for us − is the main level IIA of Tanner, much lower and more recent, which

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Names of the sites in column 1. *(4 additional columns show for each site the Maximum elevation of the Tapes shoreline, the Elevation of the site, the Late glacial shoreline, the Elevation of the site in percent of shoreline-elevation)*

1. Prestestua I
2. Prestestua II
3. Kobbholmfjord II
4. Kobbholmfjord I
5. Kobbholmfjordbotn
6. Lillevatn
7. Jernbanestasjonen
8. Messen
9. Prestegården I

10. Prestegården II
11. Seilmerket I
12. Seilmerket II
13. Langøyra
14. Eidet
15. Nesseby I
16. Nesseby II
17. Skitnelv
18. Røverelv
19. Thomaselv I (Vadsø)
20. Thomaselv II (Vadsø)
21. Stykket (Vadsø)
22. Skytterhuset (Vadsø)
23. Melkevarden I (Vadsø)
24. Melkevarden II (Vadsø)
25. Melkevarden III (Vadsø)
26. Melkevarden IV (Vadsø)
27. Sletta
28. Olahaugen
29. Molvika
30. Vardøy
31. Smellroren

dates from the postglacial era. It results from a transgression − from a rise of the sea or from a lowering of the land − that occurred long after the late glacial uplift and that was again followed by uplift of the land. It is believed that this corresponds to the Tapes transgression in southern Scandinavia.

In any case, we have two usable levels, one of which is much higher and older than the other. Both descend from the ends of the fjords to their mouths at the coast, following a steeper slope

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Names of the sites in column 1. *(4 additional columns show for each site the Maximum elevation of the Tapes shoreline, the Elevation of the site, the Late glacial shoreline, the Elevation of the site in percent of shoreline-elevation)*

32. Hamnesodden
33. Hansemolla
34. Kattuglelva
35. Ekebergvika
36. Strømmen
37. Storelva
38. Barakken
39. Vest for Berlevåg
40. Zoar
41. Skonsvika
42. Brattbakken

43. Elvevåg
44. Skjånes
45. Skarsvåg
46. Valan
47. Laholmen
48. Lafjordstua
49. Repvågeidet
50. Vedbotneidet
51. Russedalen
52. Kolvik
53. Storbukta
54. Børselvneset
55. Steinneset
56. Bossekop I
57. Bossekop II
58. Tollevik
59. Steinseng
60. Amtmannsneset
61. Inestofta

for the higher level, less steep slope for the lower. The descent of these levels appears in figs. 43 and 44 which show the profiles of Tanner along Altafjord and Porsangerfjord.[1] On these diagrams, we have plotted our sites that are located in the region.

In the tables above, I have compared the respective elevations (in meters) above current sea level: 1st of postglacial subsidence (IIA); 2nd of

[1] We also refer to TANNER's other profiles and to his isobase map, TANNER 1907, pl. IV.

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sites studied; 3rd of the late glacial level (Iε or f of Tanner), which in places (inside the fjords) coincides with the limit of marine transgression. Where there are no other indications, the figures for IIA and Iε (f) are those of Tanner (T); the site numbers are those of Nummedal (N). Of the latter, most of the measurements are taken with an altimeter barometer. The elevations marked (M) are precision measurements by Mr. Marthinussen, who extremely kindly allowed me to borrow them from a work on the Quaternary formations of Finnmark.

Fig. 45, p. 191 presents a diagram of the sites, where the shorelines of Tanner are used.

The first observation suggested by this diagram is that the sites are situated at a level above the shoreline IIA. In only one case, the artifacts − not very characteristic indeed − were found on a terrace at a higher level than shoreline level IIA (19); in only a few others, the difference between the level of the site and that of the Tapes shoreline is very considerable and reaches an average of 50% or even more. As has often been said, the sites are generally linked to the contemporary shore. The complex, taken as a whole, is geologically dated in relation to this level, and considered to be more or less later. By how much? Nothing allows us to specify it, but it is obvious that it is a considerable period, because the land rose first (to an elevation close to the current height of the sites above the sea?), then it lowered to the level of IIA.

Naturally, these are only the known sites, and not all those that existed. So, for the moment, we will not ask to what extent the Finnmarkian sites that were located at lower levels and must therefore be more recent, were destroyed by the Tapes transgression. Temporarily also, we cannot exclude the possibility for some of the known sites, whose elevation above the Tapes sea level is little, of having been established in connection with this sea level. But this possibility only presents itself at the extreme points of the coast, where the

difference is very small between the Tapes shoreline and level f (eg. 37−46). We will come back to this when we discuss the respective age of the sites.

If, on the other hand, we compare the levels of our sites with level f, we note that they are located lower than this level. Only one is found a little above (No. 9), undoubtedly because the inhabitants only found good raw material for their tools in the terraces at that elevation. In another case, which we will study later, the sites are located on the marine terrace at level f (56, 57). This means that the sites

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Fig. 45. Diagram showing the elevations of the Finnmarkian sites, in relation to the main levels in the system of Tanner. Iε (f) indicates the late glacial level, IIA the postglacial level, the level of the sea at Tapes.

are more recent than this level, perhaps with one exception, and were established more or less long after the land had begun to rise. Given the violence of the marine action on the coast of Finnmark and even within the fjords, the sites exposed to this action would in most cases have disappeared without a trace and the artifacts in a short time would have been rolled to the point of being unrecognizable.

For the Finnmarkian sites that we know, Tanner's level f is thus a chronological maximum, and its level IIA, a minimum. But, naturally, this still does not allow any conclusion about the origin of the civilization itself or its end. Temporarily, we cannot exclude the possibility of sites, still unknown or destroyed, that would be older than level f; and similarly, there could have been sites − now gone − younger than we know of, but older than level IIA, and which would have been destroyed by the sea during its rise to IIA. The only thing we can say is that the preserved sites are located between the two levels, and as none was destroyed by the sea during the transgression of level f, or reached by the sea during its transgression up to IIA, they must therefore be located chronologically between the dates of formation of the two levels or, for certain cases, at the time of formation of the last level.

It is necessary to strongly emphasize the location of our sites as compared to the highest level, because Rolf Nordhagen, in the study that we often cite, tried to present Tanner's f level as a minimum age for the civilization of Finnmark.[1] On this subject, site No. 7,

[1] R. NORDHAGEN: De senkvartære klimavekslinger o.s.v. (The change in climate at the end of the Quaternary period etc.) p. 82 etc. His thesis is very clearly formulated on p. 100.

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Jernbanestasjonen, played an important role for him, as well as for the chronological calculations by Tanner,[1] and both gave an interpretation of the facts that an archaeologist can hardly accept. This site is located on land of fairly regular slope. Below, at some distance, the slope becomes abrupt, and above is a terrace whose upper edge is the limit of the marine transgression, while the lower border corresponds precisely to line f. This is 72−73 meters above current sea level; the center of the site, about 66.5m. As for the artifacts, they were found both lower and higher, up to an elevation of 68 meters. The objects were mainly made of hornstone, quite naturally weathered, but not rolled. They were collected under the touch of topsoil which covers the ground, and up to 0.20m deep, in a bed of brown sand. These facts, as well as the difference in elevation at the site, incorrectly led these two scientists to suppose that the sea dispersed the artifacts, after having forced the residents to leave the area. According to Tanner, this would have taken place during an "episodic transgression"[2] and later, while for Nordhagen, it is the very transgression of level f, "which dispersed the artifacts laterally and vertically, up to 68 meters above sea level"[3]. But it is not at all necessary to resort to this complicated explanation. That a site covers a fairly large area, even larger than in the present case, and that consequently, when the ground is sloping, it presents a fairly large difference of elevation, this is what is seen everywhere in our shore sites. Likewise, it is a common occurrence for objects to sink into the sand, sometimes even to greater depths than here. These two facts are explained very naturally when we consider that they were living beings that inhabited these sites. The situation is basically very simple: the prehistoric people settled on the old beach, after the sea had retreated from level f and never again covered the site. The location of the site was above all determined by its location near a narrow channel, facing an arm of the sea that became Lake Kirkenes. On the other side of the channel there is also a site (No. 8, Messen) at the same elevation and in the same location (see view pl. I). Together, these sites provide us with serious points of support.

Generally speaking, the shape of the terrain is an element of great importance when studying sites in their relationships with ancient shorelines. Equally decisive is the examination of the second of the Finnmarkian sites Seilmerket, which plays a role in Nordhagen's reasoning.[4] This site is at an elevation of about 70 meters

(according to the altimeter barometer), while the level f is about 72−73 meters as at Kirkenes. The

[1] TANNER, 1930, p. 463.
[2] TANNER, 1930, p. 464
[3] NORDHAGEN, p. 83
[4] NORDHAGEN, op.cit. p. 84.

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artifacts, which bear no trace of having been rolled, were located high on flat ground. However, at the edge of the site, the ground drops suddenly, sometimes forming a scree of large stones, to the terrace where Seilmerket II is located (see view pl. H), at a lower elevation of about 10 meters. If the sea covered the last site even slightly, the location Seilmerket I was the only one where people could stay. This site is therefore younger than the maximum of level f.

Of all the surviving sites in Finnmark, perhaps only one offers traces of the stay of man during − if not even before − the maximum of level f. This is Bossekop I and II (Nos 56−57). The situation is as follows. To the east of Komsa (Kongshavn mountain), there is a plateau crossed by the road from Bossekop to Alta. On the landward side the terrain slopes towards the Alta River, while at the other edge the plateau slopes sharply onto the fjord. At the base of the slope is Tollevik (No. 58), see fig. 36, p. 114. On this plateau, the sea has formed a terrace (pl. VI), which must be contemporary with the maximum level f, and it is on this terrace that the two sites are located, the second (II) a little more protected against certain winds than the first (I). Holes had been dug there for military purposes, which led to the discovery of the sites. The artifacts were found either in the gravel that had been thrown away, or on the surface, or during the surveys subsequently carried out by Mr. Nummedal. However, among the pieces, a certain number are rolled or worn by water. In site II, this is inconspicuous; only one flint core (pl. XCV, fig. 423) shows heavy wear. On the other hand, at site I, a large percent of the material is more or less worn (p. 115; pl. XCII, fig. 404, pl. XCV, fig. 412, 420, etc.). To what exact extent the true inventory suffered from these alterations by water, we are not in a position to determine. We can no longer specify the depth at which the pieces were located in the terrace, nor a general stratigraphic situation, except that the rolled pieces were mainly found on the surface.[1] Therefore, what happened on this terrace is far from clear. But it remains certain that the sites offer a certain number of pieces that have surely been more or less rolled. And this wear, given the situation of the terrace, cannot have any other cause than the action of the sea. No stream of water could have passed through there[2] and we must also exclude wear by infiltration of water or by the aeration of sand. And note that the rolled objects come from hard rocks – quartzite and flint – which should prove very resistant.

[1] Two very rolled natural core-formed pieces (C. 24543 q) were found at about 1 meter depth in a nearby sandstone, but we cannot say with certainty whether they were originally at this depth, or caused by a landslide. In any case, for one of the pieces, we can wonder if the erosion that we observe was due to human activity or rather to mechanical action.
[2] If the Alta River, or a branch of it passed through this location before the Alta River found its present course, it could not, in any case, have occurred after the formation of the terrace.

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Besides the uncertainty that we have concerning the stratigraphy of the sites, a serious difficulty results from the fact that only some of the pieces have been rolled, and very few even at site II. Furthermore, no piece, as far as we can judge, has been rolled beyond recognition, which would certainly have been the case if the sea had been able to act freely, even for a fairly short period. From this it must be concluded that the sea did not cover the site for a prolonged period, but that it reached it, during the course of the transgression even of level f, for example by high tides when it had retreated a little, or later during a short transgression. Rolling objects are they proof of a stay prior to the rise of the waters, and the unrolled objects of a subsequent stay; Whether site I is on the whole a little older, and site II on the whole a little more recent, is not possible to say with certainty. Since in most sites the antiquities are found in the ground, in situ, it cannot be expected that all have been rolled. Their case is the same as that of shells in natural shell middens.

Thus, the study of this very important site hardly gives positive results. One thing at least is certain. If the fact observed by Nummedal is correct, that is to say if the rolled pieces were mainly on the surface on the terrace of level f, everything seems to indicate that the site is a little younger than the formation of this terrace. Even if it is much more recent, which is not necessary to admit, and if we assume that the rolled

pieces suffered the action of the sea during its regression from level f, and not from a later transgression, this site must not in reality be only be slightly later than the maximum of level f.

As for the age of these levels, everyone agrees that level IIA corresponds to the Tapes level (or Littorines), at the time of the "kjøkkenmøddings", in southern Scandinavia[1].

There is much less agreement on the age of the level f, which is explained by the extreme difficulty − not to say the impossibility − of parallelizing the levels of the coasts of the Polar Sea with the known patterns in the south of Scandinavia. Tanner sets the level f at the beginning of the "appearance of the postglacial climate", or more precisely at the time of the Portlandia sea of Øyen, a period characterized, we are told, by an increase in temperature that led to melting of ice and a rapid rise in the sea.[2] To the south of the Scandinavian peninsula, the sea would then have retreated quite far from the coast to the Romerike region, halfway between Oslo and the Lake Mjøsa, while the glaciers still reached the sea in the vicinity of the great mountain ranges of western Norway.

[1] TANNER, 1907, p. 74 etc.
[2] TANNER, 1930, p. 434.

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The climate must have been quite mild, with an average temperature in July between 8 and 14° C in southern Scandinavia.[1] Norwegian scientists and Swedes have sometimes assigned an even earlier age of this level. Thus, the Swedish geologist Asklund, from research carried out in the north of Sweden, wanted to trace the age of line f back to an early period of the Gotiglacial,[2] when the ice still extended very far into southern Sweden (fig. 46). An intermediate opinion is supported by the Norwegians Kaldhol[3] and Nordhagen,[4] who correlate the level f with the stage of "Ra", when the front of the great glacier cut the Oslofjord, central Sweden, and Finland, forming a convex line from the Åland Islands to the White Sea. This stage is very well marked by the famous sandy moraines, the "Ra", on both banks of the Oslofjord, and by the sandy moraines of Salpausselka, in Finland, which gave their name to the period. This opinion seems to agree with that of Sauramo, since, in the map of glaciations that he recently published (1931), he places the edge of the ice during the Ra period (extreme limit of the fFiniglacial period) beyond the ends of the Finnmark fjords (in starting from the sea). We reproduce here (fig 46) the map of Sauramo. For Nordhagen, the decisive proof is that the stage of the "Ra" was an exceptionally stable and long period (700 years, according to Sauramo), which must have left also a very marked shoreline in Finnmark. It can only be called line f, according to Nordhagen, because "neither in the county of Troms nor in Finnmark can we find lines prior to line f that can rival it in continuity and extent".[5] The reasoning of Nordhagen seems at first glance attractive, but he himself considers the conclusion to be unreliable and he did not take it into account in his general table.[6]

In the presence of theories presented by specialists that are so divergent and visibly unsophisticated, it is impossible, when one is not a geologist, to form a personal and well-founded opinion. All that can be said is that if the Finnmarkian came from the south, the southeast or the southwest during the late glacial period, this happened during a period that offered relatively favorable climatic conditions.

[1] C. A. JOHANSEN: Om temperaturen i Danmark og det sydlige Sverige i den senglaciale tid (The temperature in Denmark and southern Sweden during the late glacial period). Summary: p. 21. Meddelelser fra dansk geologisk Forening, t. 2, No. 12. Kjøbenhavn, 1907.
[2] BROR ASKLUND: Gastriklandska Fornstrandlinjer och Nivåforandringsproblemen (Shorelines; problems of changes in level etc.), p.59 etc. Sveriges geologiske undersokning. Årsbok 29 (1935), No. 6. Stockholm 1935.
[3] H. KALDHOL: Har vi spor efter flere istider i Norge (Do we have traces of several ice ages in Norway? Norsk Geologisk Tidsskrift, t. xII.
[4] Quotes: De senkvartære klimavekslinger etc., p. 86 etc.
[5] NORDHAGEN, quote, p. 95.
[6] It connects the Finnmarkian − for which, according to him, the line f is a chronological minimum − in the subarctic period (sea level at Portlandia) and, therefore, at the period of the later ice melting of "Ra".

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Fig. 46. Main periods of ice retreat during melting of the last glaciation of northern Europe. After Sauramo.

Theoretically, the event occurred during a period of melting ice, when it retreated and left more space for the northward push of plants, animals, and humans; but Man probably did not arrive at the beginning of this period. These events could have happened both during the Gotiglacial period and the very mild climate of

Allerød − before the time of the "Ra" − as well as during the Finiglacial period, with a subarctic climate, but probably not even at the time of the "Ra". We therefore have to choose an approximate date during a period that begins, according to the chronological method of De Geer, a little less than 16,000 years before our

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time[1], − and leads to a much later epoch that should be fixed at the end of the Finiglacial about ten thousand years ago.

In any case according to what we have said, the lower limit of this civilization must be the maximum of the regression of the sea at Tapes up to level IIA. But it can also be much older, as we will see. This is a question we will explore below. For this discussion we have to take into account the geological periods and the location of the sites in relation to the ancient shorelines, as well as the archaeological data of each site or group of sites.

* * *

The first question that arises is whether we can observe any difference in age between the various sites or groups of sites and, in this case, some evolution in Finnmarkian civilization and tool technology.

A few years ago, A. Bjørn, based on the results of the finds made at the sites of Alta, Porsanger and Berlevåg (Nos. 37−41, 49−51, 58−59), already attempted a chronological account of the civilization of Finnmark.[2] His conclusion is that it can be divided into three stages: the stage of Porsanger, that of Tollevik, and that of Berlevåg, each possessing distinctive features. The oldest, that of Porsanger, is characterized very clearly by a very coarse quartzite industry, related to the early Paleolithic; the intermediate stage, that of Tollevik, by a flint blade industry related to the Upper Paleolithic. The most recent, that of Berlevåg, is distinguished by a less frequent use of burins, and by the predominance of slices which, however, continue to have a character of scrapers. This evolution of civilization would respond to the elevation of these three sites, higher for the Porsanger stage − which Bjørn mistakenly sets at 60 meters instead of 20 to 49 meters −, lower for the Berlevåg stage, while that of Tollevik would occupy an intermediate position. Bjørn also seems to indicate that there would be even older finds in the sites that had just been discovered further away, in the east of Finnmark.[3]

[1] According to De Geer's latest assertions "the Gotiglacial period precisely began" 16,500 years before the present day. G. DE GEER: Dating of the gothiglacial icerecession in Scanodanla. C. R. de la Rèunion géol. intern. à Copenhague, 1928. Copenhague 1930.
[2] A. BJØRN: Noen norske stenaldersproblemer (Some problems of the Stone Age in Norway). Norsk geologisk tidsskrift, t. X (A 1928). By the same author: Studier over Fosnakulturen (Studies of the civilization of Fosna). Bergens Museums Årbok, 1929. By the same author: Noen bemerkninger om Komsakulturen (Some remarks on the Komsa culture). Forvännen, 1930.
[3] The civilization of Fosna, p. 28. Fornvannen, 1930, p. 347.

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As the results presented by Bjørn are adopted by Schwantes[1] and other researchers, it is necessary to point out that this interesting attempt cannot be conclusive, even though it is based on an exact knowledge of the character of the finds made at Tollevik, compared to those of certain sites in Porsanger, such as Repvågeidet, Vedbotneidet and Børselvneset. These conclusions do not agree with the general character of Finnmark's industry, which is much more numerous today, nor with a thorough examination of the elevation of sites and shoreline, as well as their history.

According to what we said above about the oblique positions of the shoreline following the isostatic uplift of the region, it is absolutely impossible to take the absolute elevation of the various sites relative to present sea level as an indicator of their relative age. If you want to obtain a more or less certain result, it is necessary to consider their position in relation to the ancient shorelines that, on the whole, determined their establishment and therefore also their elevation.[2] Among these lines, level f provides the most useful basis. Therefore, in the table on p. 188, calculations at each location show the elevation of each site in relation to this level (in %). This is the data that we rely on in the following pages. However, we should not lose sight of the position of these sites in relation to the Tapes shoreline (IIA).

To make an overall examination easier, we have also in fig. 45 (p. 191) indicated in the diagram the relationship of the sites to the main Tanner levels. But this table should be used critically. We will be careful not to say at first glance that one site is older than another because it has a higher index (in %). Basically,

almost unrestricted reading will be fine for groups of sites that are located far from the coast, where the heights above the current sea level are higher, so that there is really an appreciable distance between the Tapes shoreline, the level of the sites, and the late glacial shoreline (level f). And this graduation (in %) will be all the more likely to have a sure value if it concerns sites or groups of sites located in the same restricted area, for example in Alta. Assuming that the sites were truly linked to the contemporary shore, we must conclude here that those of Bossekop are significantly older

[1] G. SCHWANTES: Nordisches Paläolithikum and Mesolithikum, p. 247. Mitteilungen aus dem Museum für Völkerkunde in Hamburg, t. xIII. Hamburg 1928.
[2] In a "Note on the chronological position of the prehistoric finds in relation to the geological levels in the region coast of Fenno-Scandia on the borders of the Arctic Ocean" (Finska Fornminnesföreningens Tidskrift, t. XXXIX, Helsingfors 1935), TANNER tried to date a certain number of Finnmarkian sites in relation to the old shorelines. This study came to me when this chapter was already written. However, as Tanner only considers a choice of sites and I myself propose a different goal than he, his note does not disallow the following discussion.

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than those of Steinseng and Tollevik. But here too accidental causes can intervene, such as the state of the land, the greater or lesser abundance of raw materials, fish, or game, the threat of winds or bad weather, etc. And finally, we must everywhere take into account the tide and its amplitude.

On the other hand, for coastal sites, a presentation without control would be inappropriate. The elevation differences between the Tapes shoreline and level f are so small that a site could easily have a very high index (in %), even if it was so close to the Tapes shoreline that it could very well have been established in the Campignian period. In reality, many of these sites are located in such a way that it could be assumed that they were established at the Tapes shoreline; geologists make this assertion, in fact, and they relate them to the time of the Tapes shoreline (or Littorines), about contemporaneous with the Danish kjøkkenmøddings.[1] This position is particularly that of the sites No. 46, Valan (elevation 2 to 4m above the Tapes shoreline); Nos. 42 to 43, Brattbakken and Elvevåg (1 to 5 meters above the same shoreline); Nos. 37 to 41, the sites of Berlevåg (5 to 8 meters above the same shoreline) and Stykket. As for the uncharacteristic site Thomaselv I, it was assumed that it is located on the Tapes terrace itself, and consequently that it is more recent than that terrace; the Smellroren (31) and Nesseby (15) sites could date from the same period, based on the state of the land and their location.

But these conclusions are far from certain. A schematic examination of these questions is inconclusive, and the reasoning set out above may very well be false. If a site is located very close to the Tapes shoreline, this does not necessarily mean that it was established near the shore of the sea and therefore belongs to the Campignian period. It may very well be more ancient, much older even, and date from a period that determines its relationship with level f.

In fact, if we suppose that these sites were installed − like the others − in the late glacial period, when the sea washed their edge, their case would have been the following: first, the land would have risen in relation to to the sea, without us being able to say anything about it; say, for example, up to the present level. Then, thousands of years later; perhaps the sea, in turn, would have risen in relation to the land up to level IIA (Tapes). It would have, in its rise, destroyed the sites that would have been at lower levels, but naturally not those that were located higher than the Tapes shoreline. The low height of sites above this level does not necessarily mean that they are the lowest of the ancient sites, nor that they date from the time of maximum transgression of the sea at Tapes, but only

[1] H. ROSENDAHL: Komsakulturens alder (The age of the Komsa civilization). Norsk geologisk tidsskrift, 1933, p. 313 etc.

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that they are the lowest of the ancient sites that have not been reached by the rise of the sea at Tapes. Their case is, therefore, exactly that of sites located at the same old level, at the same relative elevation, but which by their location inside the fjords, where the uplift of the ground was greater, are at a higher absolute elevation, compared to level IIA (Tapes) and at the current sea level. However, in these latter sites, the difference in elevation in relation to the sea at Tapes is large enough for there to be no possible discussion.

At these low elevation sites, we can only provisionally propose the following alternative: either they were created during the maximum transgression of the sea (Tapes, IIA), or they are much older and date roughly

from a time determined by the relationship of their situation with line f. For the moment, it is impossible for us to choose one or the other of these conclusions. A result can only be obtained after an examination of the inventory of the different sites and a more in-depth study of these sites considered in their relationship with the two main levels.

Our first task is to find out if the stone industry of different sites shows an evolution from an older type to a more recent type; if, for example, sites of a relatively high level have an inventory of an archaic character, and relatively lower level sites have a selection of more advanced and recent tools; finally what, if any, is the development of this evolution. Next, we will have to ask ourselves whether the pieces of the low elevation sites above level IIA (Tapes) have a significantly more recent appearance than those of the high sites. We will start with the sites that have the highest elevation relative to the level (such as 75% or more). And to exclude as much as possible the sources of error, we will provisionally only consider sites with a very high (absolute) elevation rating, including those that present a large difference between the current sea level, level IIA and level f. In addition, we will only consider sites whose inventory is rich enough to be truly informative. The number will be quite limited, but nevertheless sufficient: these will be sites Nos. 7, 11−12, 51−52, 56−59.

Before going any further, a question must be clarified, because it has played − and must play − a role in the examination of Finnmarkian civilization. That is the relationship between raw materials and tools, that is to say the influence exerted by the type of rock on the shape and character of the tool and, conversely, the requirements that each type of tool imposed on the raw material, the choice of this or that rock for such or such tool.

It is a fact − as we have often pointed out in what precedes − that there are striking contrasts in the Finnmark industry. Generally speaking, we

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can distinguish between a coarse industry of blocks and large flakes, using rocks of heavy handling, of which quartzite is the most widespread, and on the other hand, a lighter industry of blades and medium flakes, without it being yet a pure blade industry. Finally, we can mention an industry of microlithic dimensions. In the last two groups, flint and hornstone are mainly used (but often also concurrently with other rocks), the first preferably in the western regions, the second especially in the Varangerfjord. The distribution of these different industries between the various sites is the following: The coarse industry of quartzite and similar rocks is found in its pure state in three sites that are not very rich: Valan (46), Repvågeidet (49) and Ekebergvika (35); and, with a slight admixture of small flint industry, in two richer sites: Vedbotneidet (50) and Børselvneset (54). In two sites whose inventory is of average richness and consists only of large tools, Hansemolla (33) and Langøyra (13), small cores of flint show also that a small industry was practiced. An industry composed exclusively of blades (small industry), is in reality only observed in the poor site of Prestestua II (2), in the rich site of Tollevik (58) and the intermediate rich site of Lafjordstua (48); moreover, with the addition of a slight coarse industry in the relatively tool-rich site of Steinseng (59) and the relatively tool-poor sites of Bossekop (56−57). For all other sites of some importance, we can only speak of a mixed industry, where one or another element sometimes predominates.

This difference became apparent from the first findings, and we tried to give reasons for it, but they are contradictory. Some saw it as a means of establishing levels in the Finnmarkian[1], where from a cultural or chronological point of view, the sites with pure or predominantly coarse industry being older than sites with light industry. For others, this difference is only apparent; it finds its explanation in the different character and properties of the raw material used for the tools.[2]

Without a doubt, there is in the Stone Age a fairly close relationship between the raw material and the character of the tools. This relationship is sometimes expressed by the more or less sensitive influence of the material on the tool. A coarse rock corresponds to a crude technique and large, careless tool shapes; on the other hand, a good raw material that breaks easily, allows for light shapes and careful technique.[3] As regards Finnmark,

[1] A. Bjørn: Op. cit. (Some problems of the Stone Age in Norway).
[2] G. ECKHOLM: Et nordskandinaviskt paleoliticum? (Is there a Paleolithic in northern Scandinavia?). Fornvännen, 1929.
[3] See a very suggestive study by W. DEECKE: Geologisch-morphologische Bemerkungen zur Prähistorie Badens. Prähistorische Zeitschrift, t. X (1918) p. 40 etc. Deecke summarizes his thoughts in these terms: "Dies badische Magdalenien is ausschliesslich vom Material bestimmt" (p, 42).

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this means that diabase, quartz and quartzites − in particular the dark quartzite of Porsanger and the red quartzite of the Varanger Peninsula −, although they are of good quality and very usable, are mainly suitable for coarser and heavier tools. From a technical point of view, they will allow a fairly pure chipping industry (except, as in Finnmark, for tools on cores, such as picks), with more or less crude cutting and retouching. But the dark quartzite of Porsanger will hardly lend itself to a suitable blade industry. The red quartzite of Varanger is better for this purpose, as shown by the numerous blades of Smellroren. As for white crumbly quartz, which was mainly used east of Varangerfjord, it is out of the question. Thus, a blade industry in Finnmark can only be based on hornstone and flint. We can mention by exception the use of an excellent quartzite.

Conversely, many examples show that the tools decide the choice of raw material, when the choice was possible, and the men of the Stone Age did not hesitate to go very far to find the rocks they wanted to use. The flint trade in Scandinavia, and the case of the "books of butter" so sought after from Grand Pressigny (in France) are characteristic examples from the Neolithic. For the Paleolithic, Wiegers collected many instructive examples concerning Central Europe.[1] Thus, in the Magdalenian sites of Munzingen and Rothekopf in the Grand Duchy of Baden the stone was searched for 6 and even 40 km; in Schweizerbild, at a distance of 3 to 4 km. In Wildkichli, it was at an elevation of 300 to 400 meters lower. Here we see a profound difference between the Lower and Middle Paleolithic on the one hand, and the Upper Paleolithic on the other. This is a question that is easy to study in the sites of the South of France located outside the areas of the flint[2]: while in the same site, the men of the Mousterian were content with the quartzite they found on site, especially in the form of cobbles, those of the Aurignacian went looking for flint at sometimes quite great distances. The very natural explanation for this fact is that if local quartzite was sufficient for the heavy industry of the Mousterian, only the best raw material was suitable for the Aurignacian, with its elegant tool shapes and delicate technique.

The question of whether there is any age difference between coarse and fine industry in Finnmark can only be resolved if, first of all, some indications enable us to say whether men of the Stone Age took the raw material for their tools on site, or went to look for it quite far away. This is especially important for the blade industry, which uses rocks

[1] FRITZ WIEGERS: Diluviale Vorgeschichte des Menschen I, p. 107 etc.; see especially p. 114, 116, 123. Stuttgart 1928.
[2] H. OBERMAIER: Beitråge zur Kenntnis des Quartärs in den Pyrenäen. Archiv für Anthropologie 1906, vol. IV, p. 299 etc.; vol. V, p. 244 etc.

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of good quality such as hornstone and flint. However, this second question must generally be answered in the negative. At Alta, the dolomitic flint found on site was mainly used; in the Varanger Peninsula, mainly local red quartzite; in the Kirkenes peninsula and to the east of this region, rocks of local origin, such as quartz, quartzites and diabase; towards the mouth of Porsangerfjord (Repvåg−Vedbotn), the local quartzite; inside the same fjord, the local dolomitic flint. To this is added, to a small extent, even outside the region of Alta and Porsanger, dolomitic flint carried by the ice, as well as the mysterious hornstone, whose presence can give rise to various interpretations. The most likely explanation is that it was transported by ice from sedimentary deposits in the interior of the peninsula (eastern region). This is consistent with the fact that the hornstone is found mainly in the sites of the Grensen−Berlevåg region,[1] because the ice current moved from the continent towards the sea, in a north and northeast direction. A special case is that of Børselvneset where mainly good dark quartzite was used, although the site is located within the dolomitic zone. Perhaps this exception could be explained by the absence − which seems very real − of very good flint in this region. Flint was used in the three sites of Kolvik (51−53), which are located just opposite the Børselvneset site, and which, according to its elevation, must be about contemporary with the latter. This rock is the basis of a fairly characteristic blade industry, almost Aurignacian, since the main instruments are scrapers, burins and small backed points. But especially in the most important of these sites, Storbukta, the flint is every uneven and porous, and in general of such poor quality that a good quartzite, if one had it on hand, would be much preferable. And it is quartzite that was used quite extensively at Kolvik and at Storbukta for large instruments, just as flint − on the other hand − was used for small tools from Børselvneset.

As we said above, there is reason to think that the presence of good rock determined the establishment of certain sites. But there is no evidence known to us of the transport of raw materials over a long distance, to a site or a group of sites. It is thus very characteristic that the good red quartzite, which allowed the manufacture of numerous, varied, and technically sound tools in the Varanger Peninsula − as in Smellroren − was not transported from its place of origin, for example on the other side of the fjord, to the Kirkenes

region, where the lack of raw materials must have been a serious problem, since rocks such as friable quartz and diabase were used.

Overall, it can be seen that the people of Finnmark used the rocks they had on hand, to the extent of their needs and with

[1] We refer here again to the explanations of H. Rosendahl on the different kinds of rocks, and the regions where they appear, p. 133 etc..

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the limits imposed by the raw material. This means, once again, that the quality of the rock had a certain influence on the character of the tools and the technique. This remark naturally applies especially to the coarse quartzite industry, but it is not limited to that. The flint industry in the Alta region also bears traces. We are also thinking here, in particular, of the very modest dimensions of the tools, which come from the fact that the flint is available in the form of small clumps − most often cobbles of small size − from which one can only obtain cores, flakes and small-sized blades. In the Alta sites, where the flint seems to have been very abundant, an intact core measures on average from 0.04 to 0.06m. Also the flint industry will have, even where it abounds, a small appearance and, in the sites where it is rare − and where, consequently, it is used to the extreme − a microlithic character. The hornstone, which must have been present in large pieces to the east of Varangerfjord, has sometimes provided large cores (pl. XI, fig. 20), and an industry of blades or even flakes of quite large dimensions (p1. XI, fig. 21 and pl. XII, fig. 20−23 Jernbanestasjonen).

We will have these data in mind to study the inventory of high sites that we have just discussed. In this examination, notice immediately a difficulty that we have pointed out: at most sites, in fact, we find a heterogeneous set, composed of heavy tools, coming from coarse rocks, and on the other hand a lot of lighter and finer instruments, most of which − but only most − are cut from good quality rock. It is therefore, above all, a matter of eliminating the objections that may be made due to the variable quality of the raw material; in other words: if we want to know the goal that at this recent time the inhabitants of the Finnmark in the manufacture of their tools, the types of tools they sought to produce and the technique of this manufacture, we must begin by studying sites with a relatively rich inventory, where there was an abundance of good raw material, and where it came in blocks of such dimensions that large tools could also be made from them.

The site that best meets all these requirements is Jernbanestsajon (No. 7), where the best raw material, namely hornstone, was easily found, and often, without a doubt, in large blocks. This site, which is located at an average elevation of 66.50m, and at 91% from level f, is certainly one of the oldest. In our opinion, it is shortly after the withdrawal of the sea below level f, while it was just below the site and still filled the ancient lake of Kirkenes. Among the tools we find (fig. 8−10 in the text, and pl. XI−XVII) large Mousterian-type flakes, with plain or faceted percussion bulb, sometimes retouched, a few scrapers, many

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triangular flakes and points, sometimes of a roughly Mousterian type, sometimes extensions, sometimes still similar to the pieces of Abri-Audi; on the other hand, scrapers (thick, on blades or on flakes), very numerous blades, knives on blades resembling those of Châtelperron, a host of burins, small arrowheads and other microliths; finally some slices.

The examination of the tools of this site teaches us as well that the inhabitants of Finnmark, at least at this relatively ancient time, needed very diverse instruments, ranging from scrapers and large flakes and mousteriform points − including scrapers and burins, to which are added many blades and knives on blades of Aurignacian type − up to a small industry of light arrowheads and scrapers, etc., and that they cut these tools, even those which are large or coarse, in rocks of good quality, when that was possible.

This result having been acquired, let us turn to the other typical sites, located at correspondingly high levels. We then see that all of them, with the sole exception of Tollevik, offer the same heterogeneous set of tools, sometimes with a predominance of heavy industry, sometimes of lighter instruments, but always with a more or less complete representation of the two groups. As an example, we could take Seilmerket I and II, which are only 1 km from the previous site and at a corresponding elevation, Seilmerket I just slightly higher, and Seilmerket II a little lower. This last site has a very rich inventory, where we notice (fig. 15−20 in the text, and pl. XIX-XXVIII) scraping tools or very coarse striking tools, discoid cores, flakes (sometimes Mousterian-type), points of the same type (in small numbers), blades and tools derived from blades, burins, scrapers and microliths of various shapes, finally, a fairly large number of real slicers. Seilmerket I is located just above Seilmerket II and at an elevation of 10 meters higher; according to the configuration of the place,

it must be the oldest of these two sites. The inventory of archaeological pieces (fig. 13−14 in the text, and pl. XVIII) is there very modest and gives only an incomplete idea of the industry of the occupants. However, it is enough to show that, in addition to crude instruments, they used quite numerous blades, a few burins and finally microliths. The proportion of small retouched bladelets (arrowheads), which have been preserved here, is greater than at any other site.

If there is a case where the levels and the state of the ground allow us to assert a difference in elevation between two sites, it is Seilmerket. It is therefore very important to note that the highest site (I) − and, judging by the elevation, one of the oldest in Finnmark, perhaps older than Jernbanestasjonen − already has an industry of blades and microlithic tools, and that,

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on the other hand, the supposedly most recent site has also preserved a crude industry, often of the Moustsrian type. But the same fact is reproduced in the two sites: the small industry uses above all a good raw material, hornstone and sometimes flint, and for the coarse tools one resorts to more ordinary rocks. In the latter case, the indications provided by Jernbanestasjonen authorize us to say that the product is attributable to the abundance or lack of the raw material. As good quality rock was rare, what was on hand was used.

Let us now move on to the flint regions of Alta, starting with the sites which, according to their levels, are the oldest, that is to say Bossekop I and II. The inventory (fig. 37 in the text, and pl. XCII−XCVII) is probably not rich, but nevertheless, it shows exactly the general features that we have observed in the older sites of the eastern region, of which we have just spoken: the presence of some large flakes retouched into impact instruments, scrapers and points; in addition, numerous blades to which are added a few burins and a few microliths. In this limited choice of pieces, the tranehet itself is represented.

So, we note that in these sites − which are the oldest in Finnmark, judging by their elevation − we already find a very developed light industry of blades to which microliths are added, just like in the oldest sites in Kirkenes. At Alta, flint must have been very abundant. If the few large tools found there are made of quartzite, this is undoubtedly due to the small dimensions of the flint from the site. The case is roughly analogous to that of sites poor in flint, such as Seilmerket II. But the difference is that flint is so abundant here that one was rarely forced to resort to other kinds of rock. On the other hand, this flint industry provides smaller pieces than usual, and it could not be otherwise, because of the raw material. But this has no influence on industry trends, as proven by the presence of numerous small discoid cores. Those gave rise to an industry of Mousterian character, but of very small dimensions. These conditions are clearly clarified by comparison with a site that, according to its level, must be a little more recent: Steinseng; archaeological pieces are abundant there (fig. 41−42 in the text, and pl. XCVIII−CIV) and we find large tools, like scrapers and tranehets, − especially in quartz and sometimes in quartzite, − and on the other hand, a rich collection of small flint tools: scrapers, burins, points and microliths. The Tollevik site, about contemporary (according to the elevation) and poorer, offers also an almost pure small tool industry, although with discoid cores (fig. 38−40 in the text, and more XCVI−XCVII). But here, flint was also used almost exclusively.

Among the Porsanger sites, none of the typical quartzite sites (Repvågeidet, Vedbotneidet and Børselvneset) are located at an elevation, relative or

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absolute, as it can be understood in this group. On the other hand, this will be the case for the Kolvik sites (Russedalen, Kolvik and Storbukta, Nos 51−53). There, flint cobbles, sometimes large but of bad quality, were extensively used. This gave the whole industry a more limited character, but overall we find exactly the same association: a coarse industry in poor rock, and a light industry in good quality stone. At Storbukta (fig. 38−39 in the text and pl. LXXXIV−LXXXVI) there are few large impact tools and few large flakes; on the other hand there are a lot of scrapers and points (of the general type from Abri-Audi and from Châtelperron), blades in fairly large quantities, a number of burins, scrapers and microliths. At Kolvik (fig. 31−32 in the text and pl. LXXXIII−LXXXIV), the industry has an even lighter character, due to the better quality of flint and less use of quartzite.

In total, if we can report on the geology and sea levels, and if it is true that the Finnmarkian sites are generally related to the contemporary shoreline, the result of the study that we have just carried out can be summarized as follows: it is not correct that the Finnmarkian, as we know at the moment, began with a coarse quartzite industry of almost pure Paleolithic character (lower and middle). On the contrary, all these sites, which according to their elevation must be the oldest, have a mixed industry. Coarse tools are always combined with lighter industry, with a rich complement of blades and shaped tools on blades, scrapers, burins, and microliths. The conditions of life in Finnmark and the needs of fishing and hunting made it

necessary for the people of Finnmarkian, this set of various tools. Even in the most favorable cases and where the raw material was abundant (Jernbanestasjonen, Steinseng) it is above all the tools shaped on blades and the small industry that give the industry its character.

The question of the relationship between the raw material and the tool comes down to this very simple fact that the Finnmarkian people, like all prehistoric people, preferred rocks of good quality; but when they did not have enough on hand, they were obliged to use less good ones. Without doubt, the quality of the rock was felt on the tools, a coarse rock giving fairly heavy tools, with less rigorous shapes and technique, while a good raw material of small dimensions resulted in a slight industry, sometimes microlithic in character. And vice versa: good raw material was reserved for the manufacture of delicate tools, and coarse rock was used for heavy tools. But the same trends of industry and technology were not appreciably influenced by the greater or lesser abundance or properties of the raw material.

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Let us now study the industry of sites which, according to their elevation in relation to the Tapes shoreline and according to the conditions of the ground, could be assigned to the time of this sea level. These are, as has been said, those which are found on the extreme edge of the coast of the Varanger Peninsula and near Gamvik. In all of them, local red quartzite was worked with. It is of fairly good quality and is found on site in the form of very large cobbles. Flint and hornstone were quite rare. We will naturally start with the Smellroren site, because it is the richest of all and it is at a relatively high level compared to line f, but on the other hand only 10 meters above the elevation of the Tapes shoreline. In reality, it may seem too high, because its establishment was to some extent determined by the presence of the raw material found in the moraine on which the site rests. As Smellroren has undoubtedly the most beautiful inventory there is in Finnmark, it is here or never that we can neglect accidental details. We note there (fig. 27−28; pl. XXXIX−LX) the presence of a fairly small number of microliths, but also of significant tools on blades, scrapers and burins, and a very massive industry of flakes. There are characteristic discoid cores, large flakes of the Mousterian type, sometimes retouched, lots of scrapers, a large number of flakes and Mousterian-type points, burins of the Mousterian type. Finally there are a relatively considerable number of tranchets, some of which are elongated like axes, and the best bifacial tools from Finnmark. This is exactly the same inventory as in the most representative and highest sites. The only difference is that the industry of Smellroren has an even more heavy and archaic character, that the Mousterian-type element is even more pronounced there than in the sites previously studied.

The other low sites of the Varanger Peninsula have only a reduced or very poor inventory, which naturally does not allow reliable conclusions. But the overall impression is the same. We generally find there (fig. 29, 30; pl. LXIX−LXXI) a fairly crude industry, with a few discold cores, flakes, a few large impact tools, scrapers, scrapers, a few points (Mousterian type or similar to those from Abri-Audi), burins, especially of a crude shape, and, at a single site, a blade of the Châtelperron type. The blades also have a completely secondary role. On the other hand, in the only site where hornstone was used, the microlithic industry is quite rich (No. 39, fig. 30); in another, also the only one where flint was widely used, we find flaked pieces (No. 37).

Finally, let us note that at these sites, the tranchets, both atypical and typical, are abundant and relatively more numerous than elsewhere. It is this form of tool that, with the location of the sites and their low elevation, made people think that they

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belong to a more recent date. But as the examination of the material has previously shown, pieces of this type are not only found in the low elevation sites of the Varanger Peninsula, but also in those which their elevation designates as the oldest. In Seilmerket II there are a dozen, in the other fewer. But they are found in most of the truly representative sites, from Jernbanestasjonen and Grensen in the east, to Steinseng in the west. Even in the very limited choice of tools from Bossekop, the oldest of the sites, we find a small sample (pl. XCIII, fig. 408). It is a mixture of double tranchet, atypical pieces and real Campignian tranchets, of which Smellroren offers the most characteristic example. Many of these pieces seem to have been intended to be a sort of heavy scrapers, or also scrapers, just like in the low elevation sites, but everywhere the cutting edge is the essential part of the tool, and very often it bears traces of use. Sometimes, large and good tranchets, in high sites, are cut from hornstone, and this occurs even in sites where this stone type was scarce. This is why we attributed special importance to the tool. And we would be mistaken in believing in an evolution in the

technique or in the dimensions of the tools, from the supposedly ancient sites and those that we suppose to be more recent. There are few sites where we find as many tools of atypical shape, although cut from good rock, as Berlevåg and Zoar. We have indicated above that in Finnmark as elsewhere, the tranchet can very well be a local invention of civilizations based on the technique of splintering, and the fact that this tool is found everywhere, even in the sites that we suppose are ancient, can only confirm this opinion. The tranchet can therefore be considered as a type characteristic of Finnmarkian as a whole; but it cannot be used to distinguish, in the Finnmarkian, the old layers from the recent layers.

We will spare the reader the details of the sites of the southern region of the Varanger Peninsula and will content ourselves with indicating that the same result is achieved there. On the other hand, we need to look more closely at the case of Magerøya and sites located inside certain fjords. The conclusion we reached − that the low-lying sites of the Varanger Peninsula had relatively heavy industry − is even more true of Valan (No. 46), which is at least 50% of level f, but only a few meters above the Tapes shoreline. The site is distinguished by an exceptionally crude inventory of impact tools, flakes and tools shaped on flakes (pl. LXXIII−LXXVII), while there are, so to speak, no blades and not the slightest trace of microliths. Flint and hornstone were not used, and the quartzite is of much poorer quality than the red quartzite of the Varanger Peninsula. But, even taking into account the raw material,

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all of the pieces produce a singularly archaic and primitive impression. Note that the site is quite well sheltered from the sea and this may explain that, even though it is old, it is located at such a low elevation above the Tapes shoreline. As for the fact that some of the pieces were rolled, it is of little importance here.

A similar situation is that of Ekebergvika (No. 35), which is also at 50% of level f, but a few meters above the Tapes shoreline; quartzite was used there and a crude flaking industry was practiced, without blades or microliths, as far as we can judge from the material we possess (pl. LXIV−LXVII). And yet, red quartzite was worked there, which provided at Smellroren and other sites, a rich supply of blades and tools shaped on blades. Ekebergvika immediately leads us to Hansemolla (No. 33), which however, perhaps due to the terrain, has a relatively higher level. Here we find not only a crude industry but also traces of a small industry using good raw material, as evidenced by two small cores and a chipped piece (cf. pl. LXI−LXIV). At both sites, some of the pieces were rolled. A similar situation is then observed at the Repvågeidet and Vedbotneidet sites (Nos 49 and 50), located at 50% from level f and only 7 meters above the Tapes shoreline, with a rough inventory of fragments and a small, very limited flint industry (pl. LXXXVI−LXXXTT). Next comes a relatively high elevation site, Borselvneset, that has a very distinct flake industry of Mousterian type character, and traces of a limited flint industry, with three small tanged arrowheads (fig. 35; pl. LXXXVII−XCI). Note also that this site is located, as has been said, very close and almost at the level of Kolvik and Storbukta (Nos 51−53), where flint provided the material for a blade industry − with microliths −, relatively typical (p. 207).

In this series of sites grouped in a fairly small space, we do not observe that in moving from high elevation sites to lower sites we also move, through evolution, from a flake industry to an industry of blades and microliths. The conclusion is diametrically opposed: It is at the lowest elevations above present sea level and among the lowest sites of all that we find pure heavy industry, while blades and microliths appear at the higher sites, d at first quite rarely, the most abundantly in the high elevation flint sites of the Alta region. According to current opinion about shorelines, this relationship is quite paradoxical. [1]

[1] It is precisely a reasonable assessment of the character of the inventory in certain of the known sites of Porsanger and Alta, that, combined with an erroneous interpretation of elevations and shorelines, led A. Bjørn to consider the "Porsanger stage" as older than the "Tollevik stage".

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And even if it is not as important as a superficial examination of pieces could make one believe it − because the flaking industry is also represented more or less abundantly in the flint sites −, it nevertheless requires an explanation. This, given the accepted geological system, can only be sought in the greater or lesser abundance of the raw material, its nature and its properties. But it must be added that, for an archaeologist, it is difficult to find this single explanation sufficient. We cannot help but also think that the sites which, according to the levels are the oldest, are located at the end of the Altafjord, while we would expect to find them on the coast itself. Let us also remember that if, in the future, geological conceptions were to change, the archaeological material that we possess will allow reinterpretations that should begin precisely with the examination of some of the sites on the coast, at low elevation above the Tapes shoreline.

* * *

We can end here this new examination of the details of implements of sites of varied elevation; and although it may have seemed long, it was necessary to justify the conclusion imposed, in our opinion, by the study of the tools of the various sites.

This conclusion is as follows: if the geological system that we follow in our research is correct, the Finnmarkian begins, as we have already said, by a tool industry of which not only is an integral part a crude industry of flakes, partly Mousterian type, but also, and in considerable proportions, a lighter industry of blades and strips. Next to some tools resembling punches and other crude tools on cores, as well as large flakes and instruments derived from flakes, we find blades, sometimes with lateral retouching, scrapers, backed blades, light burins of Aurignacian character, etc., not to mention a small industry the includes the same shapes as the previous ones, but smaller, and above all small tanged arrowheads.

Another conclusion: the tool industry of the sites located at low elevation above the Tapes shoreline along the coast offers no serious basis for the hypothesis according to which these sites are more recent, or even much more recent than the "old" sites located at a high elevation above the same level inside the fjords. This remark applies both to all sites and to each site in particular, as much as a sometimes very limited inventory allows.

For the history and evolution of Finnmarkian, this gives rise to a double observation: Either this civilization was maintained without essential changes during the long period that begins with the late glacial period and includes

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the entire duration of the local uplift of the land, then the entire duration of its subsidence, up to the moment of sea level at Tapes (IIA). In this case, it is probable that the ancient Finnmarkian civilization changed its appearance; that after the time of the Tapes shoreline it began to evolve towards the Eneolithic slate civilization, which we observe in the sites located below the Tapes shoreline, and which we will talk about later. However, we have not been able to discover the intermediate steps that would move from one civilization to another.

Or else the evolution of Finnmarkian was completely different and it would have ceased to exist more or less long before the maximum transgression of the sea at Tapes. We can only see this during the first part of the uplift of the land to a level that was later almost reached by the transgression of the sea at IIA. But even in this case we cannot currently exclude the possibility, for this civilization, of an existence which would be continued during the uplift, perhaps even then during the subsidence, because any trace of the ancient sites located at levels lower than IIA must in any case have been destroyed by the sea during its rise up to this level. This is, among other things, one of the difficulties that we must elucidate.

First, we hesitate to admit that this civilization has been maintained almost without change over the thousands of years that passed before the age of the sea at Tapes. The well-known parallels that we invoke, those of Australia, Tasmania, Tierra del Fuego, etc., are not in reality very conclusive, because the Finnmarkians would then have had to live in very changing climatic conditions, leading in turn to considerable changes in living conditions, and, as a logical consequence, a transformation of the tools.

Then, it seems to me that the second hypothesis gives a more satisfactory explanation of the relationship that we see between the Finnmarkian, on the one hand, and, on the other hand, the sites of the Recent Stone Age, which appeared in fairly large numbers at lower levels. These sites will not be examined here. A certain number of them, as well as the archaeological problems linked to this civilization, have been recently studied by various authors.[1] We will limit ourselves to recalling that these sites are located from the terraces of the Tapes shoreline to lower levels. As raw material one used local rocks, flint,

[1] A. NUMMEDAL: Stone Age Finds. A. BJØRN: Nye boplassfund fra yngre stenalder i Finnmark (New sites from the recent Stone Age, discovered in Finnmark). Institutetet for Sammenlignende Kulturforsknng. Serie C 11−3. Oslo 1930. G. GJESSING: Fra steinalder til jernalder i Finnmark. Etnologiske problemer. (From the Stone Age to the Iron Age in Finnmark. Ethnological problems) Instituttet for Sammenlignende Kulturforskning. Serie C III -3. Oslo 1935.

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quartzite, etc., as well as large quantities of slate. The inventory is identical or similar to that found further south along the Norwegian coast. These are sharpened or polished picks and axes, polished points and knives

of slate, arrowheads and daggers of quartzite or flint, of types known further south in Norway, and shaped by large flat retouches, etc. Finally, at more than one site quite a lot of ceramic debris is found. From the technical point of view, the only resemblance that there is between these sites and those of the Finnmarkian is that, naturally, in the most recent ones too, we encounter flake pieces (highly used cores),[1] some pieces resembling scrapers and core-form scrapers of the same kind as at older sites. An exception among these is a discoid scraper resembling the Mousterian-type "throwing stones".[2]

At several localities, the situation of these sites in relation to the old Finnmarkian sites is extremely characteristic. At Alta, for example, there are several sites just in the vicinity of sites Nos. 56−60, at an elevation of about 26m above current sea level. They have been described in detail by Nummedal.[3] At Isnestofta, site No. 61, where the elevation of the Tapes shoreline was 22.50m site II must undoubtedly be included in the group of which we are talking, and certainly site I (elevation: about 20m), where pieces of slate were found.[4] Very close to Lafjordstua (No. 48), traces were found in different parts of the site at lower levels (14 meters).[5] About 4 km from the Kolvik sites (Nos 51−52), there is a site near Trollholmsund, 10 to 12 meters above sea level, that provided pieces of polished slate.[6] Just below Smellroren (No. 31) a site located on the aeolian sand beds near the stream has also yielded objects in polished slate and, in addition, a very beautiful polished stone axe.[7] Below site No. 17, Skitnelv, a site[8] was discovered at an elevation of about 12 meters, and just in the vicinity of Nesseby (No. 13) another site, also with polished slate, on the very terrace of the Tapes shoreline.[9] Near Karlebotn, at the very end of Varangerfjord, Nummedal last summer discovered a characteristic Finnmarkian site at an elevation of 50 to 60 meters, and just below, a Neolithic site with good ceramic samples, at an elevation of 26m. In the flat field

[1] Let us cite for example C. 24845 II d, from Storbukta site, near Honningsvåg. U. O. Årb., 1931−32 p. 149, No. 41.
[2] On the lower terrace near Skitnelv site (No. 17). U. O. Årb., 1929, p. 188, No. 52. C. 24376 e.
[3] A. NUMMEDAL: Stone Age Finds, p. 23 etc.
[4] U. O. Årb., 1933−34, p. 83. C. 25470 I. In 1934, the collection found another piece of slate suitable for providing a point.
[5] U. O. Årb., 1931−32, p. 152, No. 47−49. C. 24851−53.
[6] U. O. Årb., 1928, p. 82, No. 14. C. 24180. See BJØRN: Nye boplassfund etc. (New sites etc.), p. 14.
[7] U. O. Årb.,1931−32, p. 227, No. 71 B. C. 25151. Two good round plates, in stoneware, which were used as polishers, remained at the scene.
[8] U. O. Årb., 1929, p. 188, No. 52. C. 24576. − See BJØRN; P. 15 etc.
[9] U. O. Årb., 1928, p. 111, No. 47. C. 24213.

at the base of our sites Nos 1 and 2 of Prestestua, there are at several sites and traces of sites at elevations ranging from 10m to 25m.[1]

These sites can hardly be older than the megalithic period, while others − and, it seems, for good reasons − are considered to be contemporary with the Bronze Age of southern Scandinavia, or even later.

Thus, for chronological and cultural reasons, there is a big difference between the Finnmarkian sites, even the most recent ones, and the slate sites that are located at lower levels. They must be separated by a considerable time interval, which one would expect to see determined by finds, especially in the hypothesis of an internal relationship between the two cultural groups. But similar finds do not exist.[2] In the history of the settlement of Finnmark, we pass without transition from the Finnmarkian sites of a higher level to the Tapes shoreline − and having a choice of flint, hornstone and quartzite tools, without polished stone or ceramic −, at sites at a level corresponding to or lower than the Tapes shoreline, with a very recent inventory of polished objects, sometimes in slate, and ceramics. This paradoxical situation requires a special explanation. In the study cited, A. Bjørn bases his argument on the "Bømlo transgression", − a late transgression, which was observed for the first time on the island of Bømlo south of Bergen[3], and which was later observed over considerably larger areas.[4]

This transgression, the maximum of which may be contemporary with the transition from the period of gallery burials to that of cists, would then in Finnmark have reached about the same level as the older maximum from the sea at Tapes (IIA), and consequently would destroy all the sites lower than this level, eraseing all traces of civilization of the immediately preceding epoch. Whether this hypothesis proves viable, or whether new discoveries come to change the aspect of the question, is of little importance when it comes to knowing the fate and evolution of Finnmarkian up to the time of the sea at Tapes and after that date. Here, the Tapes transgression up to level IIA must serve as our limit, as long as we have not

[1] See e.g. U. O. Årb., 1930, p. 225, No. 70. C. 24574. − Ibid. 1931−32, p. 153, Nos. 55−57. C. 24859−61, p. 232, No. 94. C. 25173.
[2] All or more can we speak of a few finds, such as at Prestegården I (No. 9) and at Isnestofta II (near No. 61), sites which both may have been established on terraces very close to a shore which corresponds to the sea lock of Tapes, and furthermore at Thomaselv I (No. 19). These are objects without character, which could belong to any period and which we have included above in our list of sites to illustrate the present case.
[3] H. SHETELIG: En landsænkning i yngre stenalder (A transgression of the recent Stone Age). Naturen, 1920, Bergen.
[4] O. RYDBECK: Stenåldershavets nivåförändringar och Nordens aldsta bebyggelse (Sea level changes in the Stone Age and Norden's oldest settlements) Lund 1928.

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proven that the second transgression, in the Recent Stone Age, exceeded this maximum. However, we have never, and for good reasons, alluded to this possibility.

Let us imagine provisionally that there is a continuous evolution from the Finnmarkian to the Eneolithic slate civilization, thus going beyond the time of the maximum of the Tapes sea level and the Bømlo transgression. In this case, we would have the following process: very late in the late glacial period, the sea continues to descend below the shoreline that is marked by the Finnmarkian sites of the time (see the diagram, p. 191). Finnmarkian people follow the regression of the sea and establish sites at ever lower levels, below IIA. Then the sea rises again up to IIA, the inhabitants move and install new sites at ever higher levels, up to an elevation such that they had nothing to gain from the sea at maximum IIA. Then, the same process repeats itself exactly. The shoreline goes down, and the sites with it, to rise again later (Bømlo transgression) in the direction of IIA, and again fall to the current level.

If the last transgression was shown at the same elevation as the first (IIA), we would find, just at the edge of this shoreline, both the slate sites of the Bømlo transgression (Eneolithic) and those of the Tapes transgression (Campignian) mixed with each other and at the same level. But the former are absent. The latter could, in theory, be sites like those of the Finnmarkian that exist at low elevations on the coast itself; or they could be a continuation of the Finnmarkian civilization, an intermediate stage between it and the slate civilization. But the sites of the latter type are completely lacking, and the Finnmarkian sites of slight elevation above IIA do not exist inside the fjords. The slate sites are also completely absent at the level where they should be found, according to this hypothesis.

We are therefore forced to assume that the most recent transgression (of Bømlo) only reached a level lower than IIA. This is also the conclusion that accords best with what we know about Norway, and this is the result reached by geology. In Finnmark, this transgression has not been the subject of decisive findings, but according to Tanner's research, it seems to have reached 55 to 58% of the maximum of the Tapes transgression (IIA)[1] until the level 7 of the same scholar, which I have also reproduced on the diagram (fig. 45). We should now find, in the interval between the level of the Finnmarkian sites, above IIA and the maximum of the Bømlo transgression (7) both the

[1] TANNER, 1930, p. 275 etc.

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shale sites, dating from the last transgression, and the Finnmarkian sites or sites that would continue the Finnmarkian, established a little after the maximum of the sea at Tapes, while the sea retreated from IIA. The shale sites are indeed there, but so far, we have not found traces of the intermediate stages.

The result of this examination is first of all that the Finnmarkian must have been interrupted, at the latest towards the maximum of the Tapes transgression, and probably before, and that we do not find any convincing traces of its continuation or of its evolution towards a new form of civilization. Our opinion, which in the preceding pages we have tried to base on the findings themselves, is that given the inventory of tools, it is extremely doubtful that any of these sites belong to a period as recent as the Tapes maximum (Campignian). It now remains for us to find out how this opinion fits with the situation of the lowest sites in relation to this maximum.

It is obvious and without doubt that inside the fjords, for example below high elevation sites such as Alta or Kirkenes, there are sites located at the same relative elevation (calculated in % compared to the shoreline f) at low elevations located along the coast. But there is not a single one at the same absolute low elevation above sea level 11A as the Tapes shoreline (see table on p.188; and fig. 45, p.191). Therefore, inside the fjords, in the current state of our knowledge, the establishment of sites must have ceased quite a long time

before the time of the sea at Tapes, at a level of regression from level f which was later not reached again by the sea at Tapes. And if, despite the lesson of the facts, we assume that these low sites on the coast were established at the time of the sea at Tapes, we will have to logically conclude that the inhabitants of Finnmark left the fjords for the coast some time before this and did not return, that the fjords were completely depopulated and the coast was populated at that time. However, the least we can say about this hypothesis is that it is absolutely implausible.

The only reasonable conclusion therefore seems to be that the low sites of the coast, too, were established around the uplift of the land, before the period of the sea at Tapes, which, in other words, means that the Finnmarkian, for some reason, appears to have been interrupted at a stage which, on the whole, corresponds to the situation of the lowest sites in relation to the level f.

If we want to determine this stage with more precision, we have to resort to elevations again.

In fig. 45, I plotted all the known sites on a table where I used Tanner's shorelines.[1] These are schematized. The result that

[1] TANNER, 1930, pl. 3.

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we obtain is therefore not always absolutely exact in detail, but local exceptions cannot weaken the general observation. We see that the vast majority of sites are grouped between the shoreline of the late glacial (level Iε−f) and level d of Tanner, which is a fairly marked shoreline, forming, in its system, the lower limit of the Littorines stage of the Øyen Ocean.[1] These sites should therefore belong to a period which, according to Tanner's system, does not perhaps exceed a millennium. There are fewer sites below level d, and of all these sites, only one is located below level c2 of Tanner. Even this one, which moreover has a scant and uncharacteristic inventory, is found, in the table, above level c1 of Tanner.[2] Level c2 belonged to a relatively ancient period, and level c1 to a later period of the sea at Pholas, the time of the regression of this sea from its maximum (in d), which, according to Tanner, would be a little earlier than the maximum of the transgression of the Ancylus Lake of the Baltic Sea.[3]

But even the level c is higher than the maximum of the Tapes transgression and the Clypeus of Tanner. This transgression, in turn, reached a higher level, and is therefore older, than the Tape transgression and Littorines (Tapes II of Tanner), contemporaneous with the kjøkkenmøddings to the south of the peninsula and with the Campignian on the continent.

* * *

What surprises does the future hold for us? That is impossible to predict. But the present state of our knowledge allows us, it seems, to fix the final stage of the Finnmarkian at an average period from the sea to Pholas, just as the level f certainly constitutes the upper limit (the oldest), for the sites we now know.

If this conclusion is correct, the Finnmarkian will therefore be a relatively short episode in the history of settlement in Finnmark. It will designate an Arctic civilization that began to appear along the coast at an ancient period of melting ice. Specifying this moment will be impossible until Quaternary geology can tell us about the age of level f. According to the proposed hypotheses, we have the choice between a more or less ancient date of the Gotiglacial (Asklund), and a significantly more recent date, during the

[1] Not to be confused with the recent Tapes transgression (equivalent to the Baltic Sea) in southern Scandinavia (era of the kjøkkenmøddings).
[2] Levels c1 and c2 were destroyed in the regions right on the edge of the ocean. On the 1930 diagram, pl. 3, from Tanner, they are interrupted below sites 51−54. Here, to make reading the table more convenient, they were restored by extending Tanner's lines.
[3] TANNER, 1930, p. 305. 28

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melting of the Finiglacial ice (Tanner), and, to cite figures, according to de Geer at most, 15 or 16,000 years before our time, or at least 5 or 6,000 years later.[1] This civilization lasted while the ice continued to melt and the land to rise in Finnmark. The lowest sites (most recent) are at a level that was not later reached by the Tapes transgression (IIA). It seems that we have good reason to relate them to an average period of the sea at Pholas, that is using figures, about 8000 years ago.

[1] See the table by G. DE GEER: Förhistoriska tidsbestämningar (Dates of prehistoric times), p. 8. Ymer 1925.

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THE FINNMARKIAN IN UNIVERSAL PREHISTORY

General conditions of this civilization. Comparisons. Origin of the Finnmarkian. Possibilities of existence in Finnmark in the late glacial period.

In the previous pages, we have had the opportunity to show how the Finnmarkian industry is above all characterized by an important "Paleolithic" element. We have also recalled a striking feature of the industry; it in fact unites characters belonging not only to a specific period of the Paleolithic, but to several, starting, it seems, from the Mousterian to the end of the Upper Paleolithic; on the other hand, it is completed by a microlithic industry that perhaps comes from the same cultural groups, but which, judging by its character, may also be more recent. This definition applies to Finnmarkian taken as a whole; it also applies, in general, to each deposit. And it is very important to note that the sites that according to their location and the geological conditions must be the oldest, are also those that already have a highly developed blade civilization with the addition of a microlithic element.

Furthermore, we have shown that the Finnmarkian sites that are assumed to be the oldest, according to current geological conceptions, cannot be before the late glacial period, that is to say at the time when the glacier ceased to cover the shores of Finnmark and even, in retreat, had already exceeded the end of the fjords. The best proof that can be given comes from the Alta region, where the Bossekop sites − which, according to the geological conditions, are undoubtedly the oldest − were discovered on a terrace that must have been formed in the late glacial period.

However, it is hardly within the fjords that we can expect to find the oldest traces of man in Finnmark. Whatever the conditions of settlement in the far north were during and after the ice age, the prehistoric people, before taking possession of the ends of the fjords, must have remained at their mouth, on the coast, in the places that were first free from ice and that were more accessible to migratory tribes. What we have just said about the age of Finnmarkian civilization naturally only applies to the sites we know today. We must admit as possible, at the periphery of the region occupied by our sites or in its vicinity, the existence

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of sites older than ours and without which such sites would not have been what they are. In this case, we would have to look for them at higher elevation, at the edge of the ancient sea levels of the coast itself, at the mouths of the fjords. There is yet another hypothesis that presents itself, although it has for the moment only a theoretical interest: it is that of even older sites, prior to the transgression (that is to say land subsidence) of the Late Glacial, and that would have been destroyed by the rise of the sea (up to level Iε, f). In theory, we could therefore admit that our sites are the vestiges of a population established in Finnmark since the earliest times, but of which all ancient traces would have disappeared with all the geographical changes in the region.

These are the general conditions that must be kept in mind in order to discuss the problem that concerns us regarding Finnmarkian civilization: what is its origin and where are its closest parallels? To begin with, this problem will be reduced to this alternative: should we admit a local tradition dating from the interglacial period, or an immigration dating from the Late Glacial?

The apparently most natural explanation, and in any case the most convenient, concerning the Paleolithic character of Finnmarkian, is obviously that of a local tradition, and Rolf Nordhagen adopted it in the book that has often been cited. For him, the civilization of Finnmark is a phenomenon parallel to the interglacial remains that he studies in the flora of this region. The Finnmarkians would therefore be the remains of an interglacial population, which would have survived the last ice age in certain ice-free regions along the northern and western coast, and which would then have occupied a more extensive area.[1] Separated from the rest of the world by the great glaciation that covered all the lands from the White Sea to Varangerfjord, these "interglacial winterers" would have maintained a remnant of stagnant civilization, with tools presenting the character of the last interglacial period. Nordhagen's theory is based on the Quaternary chronology that he proposes and according to which the Aurignacian would belong to the last interglacial period, the Mousterian to the previous glacial period (the next-to-last glacial period, Riss), and the Magdalenian to the glacial period following (the last ice age, Würm).[2] This conception of Nordhagen, which he himself declares to be only a simple hypothesis, convenient for research, would be, as we have said, the simplest solution to the problem that concerns us, if indeed it were admissible. But it comes up against two main difficulties. The first is that geologists − as we indicated in the previous chapter − are in agreement that at most only insignificant parts of the coast of Finnmark could have been free of ice during the

[1] ROLF NORDHAGEN: De senkvartære klimavekslinger etc. See in particular pages 116 etc.
[2] Op. cit., p. 102 etc.

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last ice age. If this is indeed true, all wintering life was impossible. Then, the position assigned to the Aurignacian during the last interglacial period is undoubtedly more than hypothetical. From Nordhagen's presentation, it is not easy to see what data he relies on. To the extent that I was able to verify this thesis, it is not justified by the authors he cites on the subject of a Quaternary chronology.[1] That which he proposes can therefore be difficult to maintain. On the contrary, the connection of the Aurignacian to the last glacial period is undoubtedly one of the surest points of the Quaternary chronology, which for reasons easy to understand, can only be quite uncertain. We therefore see here a striking agreement between geologists, paleontologists and archaeologists who have taken sides on the question, whether or not they adopt Penck's four ice ages or fewer. Some (R. R. Schmidt and M. Boule) place the Aurignacian in a recent period of the last ice age. Most of them (A. F. Osborn, F. Wiegers, E. Werth, H. Breuil, R. Vaufrey, V. Comment, W. Soergel, H. Obermaier, etc.) place it towards the middle of this period. Penck, as we have seen, places it in the last (cold) period of the last interglacial epoch (1903, 1908), or, in a later study (1921) places it at the beginning of the last glacial epoch. But, as far as I can judge, it is almost impossible to assign to the Aurignacian a date so back in time that we can accept as reasonable the arrival of men of the ancestral Finnmarkian civilization across the south in Norway to the coast of the Polar Sea in the last interglacial period. Otherwise, we would have to go to the extreme of the hypothesis and admit that the Aurignacian is derived from the Mousterian somewhere in the north during the last interglacial period, and that the Aurignacian civilization and its representatives, with the exception of a small remnant of population in Finnmark, moved ahead of the advancing glacial front, towards the southern regions where we find the Aurignacian sites on the edge of the glacier of the last ice age. As I explained in a previous instance,[2] this would help to understand the appearance of new human races in

[1] Nordhagen (p. 303) refers to Penck's theory, from the beginning of this century, which is based on the region of the Alps, where the Aurignacian does not exist. Even in his table, Penck places the Aurignacian in the last period (the cold period) of the last interglacial epoch, because of the loess deposits in Austria. But this is already enough to exclude almost any idea of immigration to Finnmark at that time, that is to say on the eve of the last ice age. In 1921, Penck revised his scheme and placed, as far as Germany is concerned, the Aurignacian at an ancient period of the last ice age. (A. PENCK: Das Alter des Menschengeschlechtes auf deutschem Boden. Die Umschau, t. 25, No. 14). A singular thing is that Nordhagen also calls on Wiegers to support his thesis, although the latter clearly says about the Aurignacian: "Geological age: First half of the last Ice Age about during the maximal extent of ice.". (FR. WIEGERS: Diluviale Vorgeschichte des Menschen, t. I, p. 178. Stuttgart, 1928). An important contribution to the Mousterian chronology, and subsequently also the Aurignacian in the Alps is provided by a study by A. DUBOIS and H. G. STERLIN: La Grotte de Cotencher. Station moustérienne. Mémoires de la Soc. paléontologique suisse, t. LII−LIII. 1933.
[2] Nordisk Tidskrift, Nouvelle série, volume 7, pp. 417 etc., Stockholm 1931.

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*w*estern and central Europe, and in particular the Chancelade Eskimo variety. This is certainly a possibility that can be discussed from a theoretical point of view, and which one day perhaps will reveal some shred of truth. But at this moment we can hardly hope for any usable conclusion about our study on the Finnmarkian.

On the other hand, it is clear that if the Aurignacian in the south of the continent belongs to this or that moment of the last ice age, a civilization bearing the mark of the Aurignacian or possessing Aurignacian traditions cannot be coming to Finnmark from the south or the east during the last ice age, or after the maximum of this last period − the access routes being blocked by the ice.

To the geological conceptions that are accepted today on the glaciation of Finnmark are added archaeological reasons that oppose the possibility of a local heritage dating from the interglacial period. In what follows, we will have to take as the basis of our examination the hypothesis of an immigration of this civilization in the late glacial period, at a more or less recent stage of the melting of the ice. The question that arises first is therefore to know from where and by what route the Finnmarkians could have come. Due to the immense distances and the rarity of finds from the Early Stone Age in Northern Europe, we will have to proceed on unsafe ground; but an examination of possible hypotheses is nevertheless necessary here, even if sometimes we can only arrive at uncertain results.

First of all, it will be necessary to provide an overview of the complex deposits that may be of some importance to our study; in particular it will be necessary to take into account the way people of the Early Stone Age present themselves in the north and the far north of Europe. It is only when we have drawn up the table of industries of the oldest Stone Age in the vicinity of the Finnmarkian that we will be able to study the provenance of this civilization with the hope of some results. We find ourselves here, as in several passages of this book, in the double and difficult obligation of exposing our subject, both for Scandinavian colleagues who are not geographically familiar with the study of the ancient Stone Age on the continent, and for foreign colleagues who cannot be expected to be completely aware of the problems of the Stone Age in Scandinavia. We therefore ask for the indulgence of our readers in the event that our presentation appears to them to contain superfluous details.

It will be appropriate, in the beginning, to extend the background picture that appears behind the industrial civilization of Finnmark, that is to say the series of Paleolithic deposits whose northern front extends, with more or less considerable interruptions, from England and Holland, through central Germany, Czechoslovakia, Poland, Russia and Siberia, to the vicinity of the coast

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of the Pacific. We will not insist here on describing the ancient Stone Age in western and central Europe, because it has long been very well explained in very accessible manuals.[1] It will suffice for the moment for us to note that the northern border of the prehistoric civilizations that interest us passes 50 and a few degrees of northern latitude, and in no place does it undoubtedly reach (towards the north) the latitude of the southern coast of the Baltic Sea. However, an exception must be made for a few sites that were discovered in recent years, in the vicinity of Ahrensburg-Hamburg; and as their northern location is of great importance to us, it is necessary to say a few words about it here. Their discovery − one of the most beautiful conquests that Archeology has made recently − is due to the perspicacity of G. Schwantes as a researcher and to the intelligent initiative of A. Rust when he set out to discover the traces of the stay of Man in the deposits accumulated at the bottom of the lakes barred by ice, whose edges the Prehistorics had inhabited. The result is that today, in addition to the sites located in the open air and on dry land, where only flint tools have been preserved, we know of sites, or annexes to land sites, that lie at the bottom of ancient lakes, under a thick layer of peat, and in conditions such that the inventory of bones and antlers of deer is also preserved, and that the stratigraphy and the analysis of pollen have been able to provide benchmarks used to establish the age of the deposits. From the point of view of chronology and civilization, these sites present two stages that Schwantes named the Hamburg stage and the Ahrensburg stage. The details provided by Schwantes[2] received striking and rapid confirmation following research carried out in Ahrensburg (Stellmoor) in 1934−35,[3] where the two stages are superimposed and separated

[1] Reference is made to the following manuals: D. A. E. GARROD: The Upper Palaeolithic Age in Britain. Oxford 1926. − J. DECHELETTE: Manual d'Archéologie préhistorique, celtique et gallo-romaine. I. Archéologie préhistorique. Paris 1908. − H. OBERMAIER: Der Mensch der Vorzeit. Berlin 1912. − R. S. A. MACALISTER: A Text-book of Europaean Archaeology. T. I. Cambridge 1921. − R. R. SCHMIDT: Die diluviale Vorzelt Deutschlands. Stuttgart 1912. − FRITZ WIEGERS: Diluviale Vorgeschichte des Menschen. T. I. Stuttgart 1928. − O. MENGHIN: Weltgeschichte der Steinzelt. Wien 1931.

[2] GUSTAV SCHWANTES: Vorgeschiebte von Schleswig-Holstein. Geschichte Schleswig-Holsteins. Herausgegeben von V. Pauis u. Otto Scheel, t. I, p. 51 etc. Neumunster 1934. − On the Ahrensburg stadium, see: SCHWANTES: Nordisches Paläolithikum and Mesolithikum, p. 183.

[3] The site of the excavations is located right next to the site that gave its name to the civilization of Ahrensburg and is undoubtedly an annex of this site. The name Ahrensburg, given to one (the most recent) of the cultural horizons noted there, is not entirely satisfactory, and we will undoubtedly be a little troubled, − as I was at first − noting that it is near Ahrensburg that the Hamburg stadium presents itself − and will naturally be studied − with the most certain stratigraphy. The best would be, in my opinion, to decide to delete these two names and for example replace the term "stage (civilization) of Hamburg" by "stage (civilization) of Meiendorf", according to the site discovered and presented first by Schwantes, − and, on the other hand, to bring the Ahrensburg civilization into the Lyngby group, since Lyngby axes were found in the upper stage (Ahrensburg stage) of Stellmoor, and since these two groups, according to their fauna and flora, are roughly similar. Finally, it is not impossible that part of the finds made on the surface at Ahrensburg actually belong to the oldest level, that of Hamburg ("Melendorf").

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by layers where the finds are completely missing.[1] The inventory of the oldest level, represented by the two sites of Meiendorf and Ahrensburg-Stellmoor, is characterized above all by atypical notched points, then by numerous burins, by "Zinken" (discarded drills),[2] keel scrapers, other thick scrapers, scrapers on blades, and blades very often having an abrupt retouching of the edges, of the Aurignacian type.[3] Among the rare pieces made of bone, we notice some small mysterious instruments, one end of which is curved and cut into the shape of a very stylized head with an elongated snout. This piece was given a linear and regular ornamentation.[4] In addition, a unilateral harpoon was discovered at Meiendorf which, if it had been found at a level that was impossible to date, would certainly have been classified as Mesolithic, because of the shape from the base and by analogy with the harpoons of Scandinavia and the southern and eastern Baltic. In the Ahrensburg-Lyngby level, tanged arrowheads are also numerous, but smaller and wider, closer to the classic Lyngby type; the blades do not have the retouched edges, the "Zinken" − dicarded drills − are missing; there are fewer burins. On the other hand, we see scrapers on flakes, sometimes round in shape, very large wide blades or elongated flakes ("Brettklingen"), and finally picks of the Lyngby type. Pollen analyzes and geological research are consistent and allow us to affirm that the lower horizon − the Hamburg level − belongs to a tundra phase almost deprived of forests, while the upper horizon (Allrensburg-Lyngby) belongs to a beginning forest period, with birches and pines (pine pollen, found in limited quantities, was perhaps brought by the wind). These different chronological and climatic conditions are also found in the fauna, because the lower level mainly gave remains of skeletons of reindeer, then of wild horse, pig, swan, goose, snow partridge, crane, seagull, pike (?), − while on the upper level animals such as elk and beaver indicate the proximity of the forest, although the reindeer is still the dominant element of the fauna.

It is important to note that in the layers that separate the two cultural horizons, we noted a thin seam of peat that was very rich in pollen of

[1] On the excavations and the finds, see the preliminary communications of A. RUST: Die jung-paläolithischen and frühmesolithischen Kulturschichten aus einem Tunneltale bei Ahrensburg (Holstein) (Grabung Stellmoor). − K. GRIPP: Die erdgeschichtlichen Aufschlüsse der Grabung Stellmoor. − R. SCHÜTRUMPF: Pollenanalytische Untersuchungen der Magdalénien- and Lyngby-Kulturschichten der Grabung Stellmoor. All these studies have appeared in: Nachrichtenblatt für deutsche Vorzeit, t. XI, 1935. Personally, I owe a large debt of recognition to Professor G. Schwantes and M. Rust who allowed me in 1935, to visit the excavations and still unpublished finds.

[2] SCHWANTES: Schlesw.-Holst., fig. 53.

[3] SCHWANTES: op.cit., fig. 43 etc.

[4] SCHWANTES: op. cit. fig. 68. On a piece from Ahrensburg-Stellmoor, a small unretouched flake of flint was embedded in a perforation made near the curved end. This is what led Rust to call this type of tool "Riemenschneider."

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pine and that marks a push of the pine forest towards the north, due to a temporary period of harsher weather. This phase, according to Schutrumpf, would perhaps be parallel to the Allerød oscillation in Denmark, that would thus mark a terminus post quem for the Ahrensburg-Lyngby civilization.

It is also necessary to say a few words about the eastern regions where the research undertaken in recent years has just brought new results that are relatively little known. For Poland, an overview was given in 1924 by L. Kozlowski,[1] but it can be largely completed following recent research.[2] The overall judgment will, however, be about the same, i.e. say that the Polish Paleolithic, which, within a few sites belongs to the Aurignacian and to later periods, is generally widespread in the south and southeast of the country. Towards the northwest in the direction of the corridor, there have not yet, as far as I know, been made any discoveries that can be related to these periods. However, a group of sites extends a little further north, and although little known, have aroused keen interest among specialists; and even given them a role for the ancient Stone Age in Scandinavia and northern Germany that they probably do not deserve. It is the Swiderian, so named after the Swidry Wielkie site, located about 20 km N. E. of Warsaw.[3]

The Swiderian is a blade industry; the inventory of tools, fairly stereotyped, consists mainly of blades, rarely with good retouching of the edges, scrapers on blades, burins, and especially tanged points, derived from narrow blades and blades with Proto-Solutrean retouching of the lower side, near the tang. This civilization, which, according to Sawicki, began at the same time as the Magdalenian evolved (that geologically corresponds to the Smidstrup stage in Denmark), extended a little towards the north. So far, it has been observed along the banks of the Niemen, about as far as Kaunas, in Lithuania, at 55° north latitude. These are the middle and recent phases of this civilization that are represented there (Swiderian II and III). According to Antoniewicz, the oldest finds date from a late period of the sea at Yoldia.[4]

[1] LEON KOZLOWSKI: Die Altere Steinzeit in Polen. Die Eiszeit, t. I. Leipzig 1924.
[2] According to a kind communication from J. Kostrzewski, numerous Aurignacian sites were explored by Sawicki in Volhynia. Krukowski explored many loess sites of Magdalenian character. Other loess sites have been discovered near Przemysl in southern Poland.
[3] LUDWIK SAWICKI: The Swiderian industry of the Swidry site Wielkie I. Przeglad Archeologiczny, t. V. Poznan 1935. Text in Polish with a detailed summary in French. At p. 37 of this work, Sawicki draws attention to the hitherto frequent confusion of the Swiderian and the Chwalibogowician industry, created by Kozlowski. Sawicki sets the latter apart as an original, independent group, and a little more recent than the typical Swiderian. − L. KOZLOWSKI: Epoka Kamienia na wydmach wschodniej czesel wyzyny Malapolskiej. Archiwum Nauk Antropologicznych, t. II. Warsaw 1929. From the same: L'époque mésolithique en Pologne. L'Anthropolgie, t. XXXVI, 1926.
[4] WLADIMIR ANTONIAWICZ: The oldest remains of Man in North-Eastern Poland and Lithuania. Transactions of the II International Conference of the Association on the Study of the Quaternary Period in Europe, fascicle V. Leningrad and Moscow 1935.

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In Russia and Siberia, a small number of Paleolithic sites were already known in the previous century. However, it is only during the last generation or rather during the last ten years that serious research has been carried out. The result is many new deposits and a more in-depth study of the old ones; but it goes without saying that the map of the stay of the prehistoric people on the immense expanses in question here can only be extremely fragmentary. In 1935[1] many sites were known, from the western border of the country, to a little beyond 40º longitude (east of the Greenwich meridian), that is to say about halfway between the Polish border and the Urals. The most eastern and northern of the sites in Russia is Karatsharovo, near the Oka River, in the vicinity of Murom, about 56º north latitude. In the deposits, we have not observed certain evidence of the ancient Paleolithic, and, if we put aside the Crimea and the Caucasus, only one site in this entire area seems to be able to belong to the Mousterian (on the banks of the Derkul, a tributary of the Don). The rest of the sites belong to the Upper Paleolithic. Likewise, we seem to be in agreement that the Lower Aurignacian is not found in the Russian plain. The entire complex dates, according to the best experts, from the late Aurignacian and later periods.

The Russian Paleolithic seems to have a very distinctive local color. We have some difficulty establishing the chronology, and for example, we do not see very clearly the group's relationships with the centers of central and western Europe. Some sites (Karatscharovo, cited above, Kostienki III−IV (Voronezh province), Kirillovskaja I in Kiev, Stlidenitzy in Podolia) are distinguished by a fairly simple and crude inventory of flint or siliceous stone ("Geschiebekiesel"). These are coarse scrapers (planes), blade scrapers, a surprising number of coarse burins (up to 80−90% of the total tools), polyhedral or others. In the fauna, the mammoth plays a predominant role. Efimenko places these sites in the Magdalenian period, but the material seems rather reminiscent of a sort of primitive Aurignacian. In other cases, the more or less close relationship with the Aurignacian is noticeable. These are the sites Borshevo I and Kostienki I in the province of Voronezh, and that of Gagarino in the government of Tambov. In addition to a rich and characteristic inventory of flint, where the Solutrean influence is recognized,

[1] As far as Soviet Russia is concerned, we stick here above all to the general exposition of P. EFIMENKO: Die paläolithischen Stationen der osteuropäisehen Ebene. Transactions of the II International Conference of the Association on the Study of the Quaternary Period In Europe, booklet V. Leningrad−Moscow 1935. − See also in the same publication: K. POLIKARPOWITCH: Das Paläolithikum der Weissrussischen S. S. R. and einiger Nachbargebiete am oberen Dnjepr. For reproductions of the pieces, I refer to the works that I have been able to consult, in particular L. SAWICKI: Materials in the Prehistory of Russia. Prezglad Archeologigiczny, t. III, Poznan 1926−27, and for Ukraine, to different studies by M. Rudinskyj, Th. Vovk, etc. Anthropologie (Annuaire du Laboratoire d'Anthroplogie de Th. Vovk), Ukrainian Academy of Sciences.

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female statuettes were found in the last two sites that bear a striking resemblance to pieces of this type from central Europe (Willendorf) and western Europe (perhaps especially Menton).[1] At these sites added to that of Mézine, in the government of Tschernigov, with its very degenerate female (?) statuettes, imitating phalluses, and the famous bone bracelets with engraved ornaments with meandering shapes.[2]

A characteristic western European type Magdalenian does not seem to exist in Russia. But the period in question here presents many deposits of more or less marked Magdalenian character; they mark an evolution

leading to a fully developed and well-represented Mesolithic in the plains of eastern Europe. Among these finds, let us mention only those from Suponevo and Timonovka near Bryansk, which are the northernmost in western Russia.

A few years ago, Obermaier observed that the Upper Paleolithic in Russia is a sort of prolonged Aurignacian,[3] of the same type as the Capsian, and that it gradually evolves towards the Mesolithic. Russian scientists today constantly emphasize the archaic character of this civilization, the reason being that the most important game was always the mammoth, and that consequently the conditions for hunting, diet, and social relationships that resulted from it were also always the same. It should, however, be noted that these sites may be closer to each other in terms of their civilization and their date than is usually agreed. They all group together, with a singular regularity, at the edge of the great glaciation, and it is possible that we must look for sites from a very late Paleolithic further towards the north, along the ancient edge of the glacier and on the lands previously covered by the glacier. Until now, the northernmost of the Paleolithic sites in Russia are located at about 56° north latitude. But if we have not yet discovered sites further north, it is perhaps for purely accidental reasons, such as the absence of research.

East of these sites on the Russian plain extends an archaeologically empty space of about 3000km before Paleolithic sites are found. It is not possible today to say to what this "hole" is due: to the lack of research or to other reasons such as the glaciation of the great mountain ranges of the Urals. In any case, the nearest sites are

[1] S. REINACR: Une nouvelle statuette féminine en ivoire de Mammouth. L'Anthropologie, t. XXXIV. (Kostiensky I). S. ZAMIATNINE: Gagarino, pl. I−IV. Academy of the history of material culture. Moscow-Leningrad 1934, and E. A. GOLOMSRTOK: Trois gisement du Paléolithique supérieur russe et sibérein, fig. 1. L'Anthropologie, t, XLIII (Gagarino).
[2] FEDIR VOVK. Industrie en os de la station paléolithique de by Mizyn. Th. Vovk Anthropology Laboratory. Ukrainian Academy of Sciences. Kyjv 1931.
[3] Reallexikon d' EBERT XIII, p. 33.

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in Siberia. According to Sosnowsky, who last studied the Siberian Paleolithic, we know of nearly 50 sites (1935).[1] Without mentioning a small deposit discovered near Tomsk in western Siberia, they are grouped into three regions, which, perhaps also, is by chance of the research undertaken in this immense field. The westernmost and largest group is located along the upper course of the Yenisei, at about 53−57° north latitude. Mount Afontova, near the town of Krasnoiarsk, gave its name to the most important sites in this region (4 in total), one of which is the first known in Siberia, discovered by Savenskov and briefly presented by Baye.[2] Another was the subject of a monograph, with more numerous reproductions than usual for Siberian sites.[3] The Afontova sites, as well as others, were also studied by v. Merhart in the work cited further.

The second group is located near Irkoutsk, on the banks of the Angara River. Here, we especially know the site of the village of Malta because of the numerous works of art that it has provided. These are sometimes sculptures in the round − for example around twenty female statuettes of Aurignacian character and figures of birds − sometimes decorated pendants, tools and plaques of bone and antler, including one engraved bone plate representing a mammoth.[4] The third group is located south of Lake Baikal, very close to the Mongolian border, 1200 km from the well-known deposits discovered by P. Teilhard de Chardin, during his research in the province of Ordos in China west of Beijing[5] and about the same distance from the rare deposits of Manchuria, which perhaps also date from the Paleolithic period.[6] Finally, let us cite a tool in stone from near Vladivostok, which H. Breuil compared to similar tools from Ordos, and here we are at the very coast of the Pacific Ocean.[7]

Compared to the Paleolithic of western Europe, the Siberian Paleolithic seems singularly foreign, with its tool industry so heterogeneous. On the one hand, it has large percussive instruments, shaped like punches,

[1] G. SOSNOWSKY: Die paläolithischen Stationen des nördlichen Asiens, Transactions of the II International Conference of the Association on the Study of the Quaternary Period in Europe, booklet V. Leningrad−Moscow 1935.
[2] LE BON. J. DE BAYE and TH. VOLKOV: TLe gisement paléolithique d'Aphontova-Gora près de Karsnoïarsk (Russie d'Asie). L'Anthropologie t. X (1899), p. 12 etc.
[3] N. AUERBACH: The Paleolithic site Afontova Gora III. The work of the Society for the Study of Siberia and its productive forces. Issue 7 (1930). Text in Russian, with summary in French.
[4] A. SALMONY: Die Kunst des Aurignacien in Malta. I. P. E. K. 1931. As another accessible study, let us

cite E. A. GOLOMSHTOK: Trois gisement du Paléolithique supériur russe et sibérien. L'Anthropologie, t. XLIII (1933), p. 341 etc.
[5] M. BOULE, H.BREUIL, E. LICENT and P. TEILHARD: Sur le Paléolithique Paléontologie humaine. Mémoire No. 4, Paris 1928.
[6] V. J. TOLMATCHOV: On the Paleolithic of Manchuria. Eurasia Septemtrionalis Antiqua. t. IV. Helsinki 1929.
[7] H. BREUIL: Pierre taillée présumée paléolithique de Skotovo (Sibérie orientale). L'Antropologie, t. XXXV, 1925, p. 404

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and a crude industry of flakes with discoid cores, scrapers, and Mousterian-type points, and on the other hand an industry of blades that, sometimes, is of purely microlithic character and dimensions. In the bone pieces from one and the same site, we find command sticks alongside bone points, with a groove for inserting flint flakes ("fuglepiler" = bird arrow heads) of the type at Maglemose;[1] at other sites, bilateral harpoons of Azilian character, with the crude stone instruments of which we have spoken.[2] G. V. Merhart, who was the first to analyze the characteristics of the Siberian Paleolithic in his excellent study of 1923, which is unfortunately not very accessible,[3] tried to discern two elements in this civilization. At the base, there would be a Mousterian of Asian origin, exposed to repeated, and sometimes delayed, European influences. The Aurignacian contribution is in particular very sensitive. Merhart's thesis is essentially adopted by scholars like Sawicki,[4] and opposed by a younger generation of Russian prehistorians, but it received undeniable confirmation by the discovery of the Malta site near Irkutsk (1928), which through Mezine seems to be linked to this group of southern Russia and central Europe that we have just mentioned. A mixed character corresponding to this one, distinguishes the cited deposits of China (Choei-tong-keou). Here too we see at the base a Mousterian element, with the addition of a lighter industry, having the character of the Upper Paleolithic. And as H. Breuil, in his study on these deposits, attributed them to a sort of local Aurignacian, some researchers have supposed that the Paleolithic civilization of Siberia would have come from the civilization of Ordos, located 1200 km further toward the south.

For us, the links that unite these various groups of Asian civilizations and their relationships with the cultural complexes of Russia and Central Europe are not specially important. On the other hand, there are reasons to emphasize, once again, the archaic features and the heterogeneous character that distinguish the Paleolithic of northern Asia. It is a set of heavy and light tool forms, a mixture of old and new, whose equivalent we find nowhere in the classical Paleolithic of Europe, but which, as we have seen, is one of the distinctive features of the Finnmarkian civilization. This resemblance also extends to the selection and the use of the raw material (stone). As in Finnmark, the hunters at the Siberian sites mainly used coarser rocks, such as siliceous shale, siliceous sandstone, quartzite, and jasper, for their heavy archaeological tools, while flint was mainly used for the smaller and lighter tools, of Upper Paleolithic or

[1] SOSNOWSKY, op. cit, pl. IV.
[2] SOSNOWSKY, op. cit., p. 286, fig. 15 and Pl. VI.
[3] G. V. MERHART: The Palaeolithic Period in Sibiria: Contributions to the Prehistory of the Yenisei Region. American Anthropologist, t. 25.
[4] Materjaly do znajomosei prehistorji Rosji, according to Sosnowsky, op. cit., p. 293.

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Epipaleolithic character[1]. Whether or not we admit a more or less close internal relationship between the two groups of deposits, the Early Stone Age in Siberia will in any case offer exceptional interest for the study of Finnmarkian civilization.

We will then understand the importance that the chronology of the Siberian sites has for us. No doubt, it is far from being precise and experience has shown that it is extremely difficult to arrive at a certain result. Some scientists wanted to link at least part of the sites to the Aurignacian, especially starting from the hypothesis that we have mentioned, of an influence from European deposits or of a concordance with them. But most recent research assumes a significantly later date. Thus, V. Gromov for geological reasons, and N. Auerbach and Sosnowsky for archaeological reasons, related the entire complex to the Late Glacial or Finiglacial period, corresponding to the late Magdalenian and later civilizations. Sawicki seems to want to go even further and date this complex from the age of the Ancylus Sea, which corresponds to the Epipaleolithic of the Baltic Sea.[2] For the chronology too, there would therefore be an approximate agreement with our sites in Finnmark.

This brief overview of the northernmost deposits of the Upper Paleolithic in the different regions will

suffice for our presentation. A preliminary result is that the northern limit of this civilization rarely exceeds 50° north latitude. Very sporadically it extends to about 55° in sites known so far − in Holstein-Jutland, in the east of the Baltic, and in central Russia and in Siberia.

As for the internal relationships that may exist between these various groups of deposits, we will limit ourselves here to saying that this immense expanse is divided, roughly, into two cultural domains, one in the west and the other in the east. In western Europe and above all in France, the Upper Paleolithic follows the well-known cycle that starts from the Aurignacian, passing through the Solutrean and the Magdalenian, ending in the Azilo-Tardenoisian. In the east, this evolution is difficult to observe. The Magdalenian is represented more and more sporadically towards the east as far as Poland and Czechoslovakia; further afield, it takes a weakened form, but in vast regions, it is Magdalenian with an altered and local character, or missing a feature as essential as naturalistic animal art.[3]

[1] K. AUERBACH: Zur Frage nach dem Material der sibirischen Steingeräte. Der Weltkreis, 1931.
[2] Summary of various assessments by Sosnowsky, p. 289 etc.
[3] It is almost a mystery, in the current state of our knowledge, the small, admirable object of art from the shelter of Pekarna (Kostelik) in Moravia. There are three bison − two of which are fighting − reproduced with an elegance, a certainty in observation and in drawing that are reminiscent of the best French works. However, if it is correct, as Absolon asserts, that in this drawing the slender type of the animal represents an oriental variety of bison, the work must also be attributed to a local artist. K. ABSOLON and R. CZIZEK: Die palaeolithische Erforschung der Pekarna-Höhle in Mähren. Dritte Mitteilung für das Jahr 1927, pl. XXTT, fig. 11. Brno 1932.

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Moreover, as we advance towards the east, we see more and more the predominance of a civilization that, for the most part, has retained an Aurignacian aspect, and which in art uses a decorative style with geometric patterns. The Magdalenian must therefore have its cradle in the west, despite the difficulties that arise for example from the origin of the harpoon civilization.

On the other hand, it must be recognized that the origin of the Aurignacian is still completely obscure. When H. Breuil, in his brilliant early work, definitively established the chronology of this era, it seemed natural to him to seek its origin in the Capsian civilization of North Africa[1]. This suggestion could not be maintained[2] and since then, even Mr. Breuil has been tempted, like others, to look for its origin far away towards the east;[3] a current of civilization from there would have headed towards the west, then divided, sending one branch to the north of the Mediterranean and another to the south. It is undoubtedly the recent discovery of the Ordos deposits that is the basis the of such a clear explanation. However, this theory encounters a difficulty, because the oldest phase of the Aurignacian does not seem to be represented in the Russian plains.

This objection, which partly explains Mr. Breuil's first hypothesis, has even greater force today when new deposits and research continued for the past twenty-five years have given us increased certainties. But if it is true that the Aurignacian was only introduced into Russia (and into large areas of central Europe in the vicinity of Russia) at a relatively recent period in its evolution, it is difficult to suppose that Europe received it from Asia. And then, as far as we can judge, there are only two possibilities. Either the Aurignacian proceeds − by direct origin or through its intermediary − from the Mousterian Aurignacian of Moravian quartzite, which K. Absolon has studied in several works.[4] Or Moravia, where up to 130 large sites of Mousterian or purely Aurignacian civilization are known according to Absolon, will therefore necessarily play a major role in the judgment that

[1] H. BREUIL: The subdivisions of the Upper Palaolithic etc., p. 175. Congrès internat. préhist. Genève 1912.
[2] E. G. GOBERT and R. VAUFREY: Deux gisements extremes d§Ibéromaurusien (see in particular p. 489). L'Anthropologie, t. XLII. Paris 1932. R. VAUFREY: Notes sur le Capsien. L'Anthropologie, t. XLIII. Paris 1933.
[3] This hypothesis only appeared in his descriptions, as far as I know, in 1931: H. BREUIL: L'Afrique préhistorique, p. 73. LEO FROBENIUS−HENRI BREUIL: Africa. Cahiers d'Art, 1931.
[4] Among the works that I was able to consult, let us cite those of ABSOLON: On the true characteristics of the Paleolithic industries of Sipka and Certova dira in Moravia. Anthropologie t. X. Praha 1932. − Die palaeolithische Erforschung der Pekarna-Höhle in Mähren. Erste, zweite und dritte Mitteilung. Mitteilungen aus der palaeolithischen Abteilung am Mährischen Landesmuseum, No. 1, 5 and 26. Brno 1926, 1927, 1932. − Otaslavice, eine neue, grosse palaeolithische Station in Mähren mit Quartzit-Aurignacien. Mitteilungen

etc., No. 40. Brünn 1935. − Über Grossformen des quarzitischen Aurignaciens der palaeolithischen Station Ondratice in Mähren. Mitteilungen, etc., No. 42. Brünn 1935−36.

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the future will make on the Aurignacian, and we eagerly await the results of the extensive research that is carried out each year.

Or else the Aurignacian comes from Mousteroian groups of western Europe, probably on the basis of the Levalloisian, which had already introduced a civilization of the blade, scrapers, and burins. All things considered, it is still this last supposition that is the most probable, since the intermediate stages seem to be missing between the primitive and Mousterian civilization of quartzite and the quite late Aurignacian civilization of flint, which is also represented in the caves of Moravia. If this is so, we would have to assume an expansion from west to east towards Russia and towards the east of central Europe where the influence of the Solutrean domain of Austria-Hungary is felt in places.[1] The relatively recent but archaic Aurignacian of Russia would then be a peripheral civilization, more or less delayed, analogous on the whole to the Grimaldian in Italy, the Aterian in Africa, the Cresswellian in England, and perhaps to the Finnmarkian in northern Norway.

Whatever the case, it seems obvious that this late eastern Aurignacian had a very great expansion that moved out in a northwestern direction. As far as we can judge, it is this, more than the western Magdalenian, that is the basis of the civilization that we find in the regions covered by the glacier − or neighboring the glacier − on the southern coast of the Baltic Sea. For a long time they characterized the oldest Stone Age deposits in Scandinavia. Schwantes saw very clearly that this arrival from the southeast can be recognized in the deposits on the Hamburg level. When he also discovered the influence of the western Magdalenian, it was perhaps because of the unique Meiendorf harpoon. Now the origin of the harpoon civilization in the French Magdalenian is, as we have said, a question that is still very uncertain, and certain eminent scholars cannot explain it other than by an oriental influence.[2] But it seems to me that one thing is certain: the Meiendorf harpoon cannot be French, because of the shape of its base. On the other hand, the characteristic reverse barb that is found at the very bottom (the opposite barbs located immediately above have, in my opinion, a secondary importance and are a result of the shaping of the object) is found on a more or less large scale on the relatively recent harpoons from Scandinavia; it is also found on the large one-sided harpoons from the Havel clays, in the Brandenburg pond.[3] If the harpoon had been found

[1] See on this subject the overall overview of H. BREUIL: Notes de voyage paléolithique en Europe centrale I−III. L'Anthropologie, t. XXXIII, etc.
[2] H. Breuil, in a conversation in the fall of 1935 with the author of this book, considered this solution likely.
[3] R. STIMMING: Die Ancyluszeit in der Märkischen Havelgegend, fig. 2−7. Archiv für Anthropologie. Neue Folge, t. XXI. Braunschweig 1928.

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without any means of fixing its date and if we could not characterize the material from which it is made, its shape would certainly place it in the Mesolithic period, perhaps even in a later period, as we have elsewhere to do for the Havel deposits. In another memoir, I had the opportunity to underline the importance of these for a fair understanding of the Balto-Scandinavian bone industry and I then proposed an older date than we usually want to have for some of these objects.[1] The harpoon recently discovered in the Hamburg stage confirmed my opinion. The chronology of the Havel finds is uncertain and it cannot be otherwise, given the way in which they were obtained. In all likelihood, in the state that they are presented to us, they contain objects from quite different periods. According to the lessons provided by the discoveries in the Hamburg region, I am inclined to link part of the finds, and in particular several forms of harpoons, to the "Magdalenian", and I mention again on this occasion the small ornamental sculpture in the round, very simplified, that Schwantes had the merit of publishing[2] and which, according to recent finds in Moravia, could very well have its models in the southeast.[3] We must deeply regret that the flint tools that must necessarily have accompanied such a rich bone industry have not been found, and that the stratigraphy and the state of the deposits present themselves in such an uncertain manner. Under other conditions, we would perhaps have had richer sites, such as Abrensburg-Stellmoor, and through them, more certain data on these civilizations and their origin. To account for this civilization of flint and harpoon, relatively ancient for the north, we must assume that an influence coming from the east or the southeast is extremely likely. Concerning the Lyngby civilization, this fact is illustrated by the extension taken by the wooden pick of Renne, the characteristic fossil which is clearly oriented towards the southeast, especially if we add to the previously known pieces[4] two pieces not yet published from the Saale region, mentioned by N. Niklasson.[5]

The initial type of this form of tool is perhaps the club or the reindeer antler pick of which many are known in the Magdalenian of Moravia, and which in reality is technically identical to the pick of Lyngby. The same parts of the wood are used, sometimes in the same way as for the manufacture of Lyngby picks,[6] sometimes in the opposite way, the handle being

[1] Skipshelleren site in Straume in the province of Nordhordland; see especially p. 26 and p. 55. Bergen 1934.
[2] Nordisches Paläolithikum and Mesolithikum, fig. 32−33.
[3] K. ABSOLON: Pekarna III (1932), pl. XXII, fig. 8.
[4] G. EKHOLM, map of finds, in EBERT's Reallexikon, t. III, p. 325.
[5] N. NIKLASSON: Råö och Varberg, p. 10, note 2. Arkeologiska studier tillägnade H. K. H. Kronprins Gustaf Adolf. (Archaeological studies dedicated to His Highness King Crown Prince Gustave Adolphe.) Stockholm 1932.
[6] K. ABSOLON: Die palaeolithische Erforschung der Pekarna-Höhle. Dritte Mitteilung, pl. XIX, fig. 1.

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formed of the bay-antler, while the pole itself provided the club or the tip of the pick.[1] But this last process is only another use of the two possibilities offered by this part of the wood.

Likewise, I am still of the opinion that the Havel deposits, including those of Hamburg, or what precedes them, provide the key to the later civilization of the Bone Age, on both shores of the Baltic Sea.

The subsequent evolution of these semi-Nordic regions is well known to all specialists, even outside Scandinavia.[2] In addition to deposits of the Lyngby type,[3] included as it should be according to us, the Ahrensburg stage of Schwantes (which can now be dated to the period immediately after the Allerød oscillation, p. 225), are found to the west the Mesolithic deposits of North Germany, presented to the public by Schwantes, then the famous deposits of the Maglemose group, in Denmark,[4] which, according to Jessen's research, belong to the same relatively short span of the Boreal period.[5] Let us also mention here the singular primitive flint tools from Samsø (the coups-de-poing, large coarse drills (?), similar to the one in our fig. 357 (pl. LXXXIV), some hand points, tools resembling scrapers) which were reproduced by Th. Mathiassen and which he links to the intermediate period between the stage of Maglemose and the kjøkkenmøddings.[6] In the regions east of the Baltic, we have, as ancient testimonies − in addition to the Swiderian of Lithuania of which we spoke previously − the Tardenoisian deposits, then, in Estonia, the very well-known and discusssed deposits of Bunda,[7] which now seem to date with certainty to the time of the Ancylus Sea, perhaps even at its maximum.[8]

[1] ABSOLON: Pekarna, zweite Mitteilung, pl. X, fig. 6.
[2] See an excellent overview by G. EKHOLM: Nordischer Kreis, in the Reallexikon der Vorgeschichte d'EBERT, t. IX.
[3] See EKHOLM's article on the Lyngby civilization in EBERT's Reallexikon, with a map of the finds, and the often cited work by SCHWANTES (1928) on the Ahrensburg civilization. − KARL HORMANN: Ein neues Vorkommen der Lyngbystufe in der Mark Brandenburg. Prähistorische Zeitschrift, t. XVIII (1927).
[4] G. F. L. SARAUW: En Stenalders Boplads i Maglemose ved Mullerup etc. (A Stone Age site in Maglemose etc.) Aarbøger for nordisk Oldkyndighet, 1903. − K. FRIIS JOHANSEN: En Boplads fra ældste Stenalder i Sværdborg Mose (A site of the oldest Stone Age, in Sværdborg Mose), Same review, 1919. − H. C. BROHOLM: Nye Fund fra ældste Stenalder. Holmegaard- og Sværdborgfundene (New deposits of the oldest Stone Age, etc.) Same review, 1924 − E. WESTERBY: Stenaldersbopladser ved Klampenborg (Stone Age sites of Klampenborg). Copenhagen 1927.
[5] KNUD JESSEN: The Composition of the Forests in Northern Europe in Epipalaeolithic Time. Det Kgl. danske Videnskabernes Selskab. Biologiske Meddelelser. (Royal Danish Academy of Sciences. Biological communications), t. XII. 1935.
[6] THERKEL MATHIASSEN: Primitive Flinteredskaber fra Samsø (Primitive flint tools from Samsø). Aarbøger for nordisk Oldkyndighed, 1934.
[7] C. GREWING: Geologie und Archaelogie des Mergellagers von Kunda in Estland. Archiv fur die Naturkunde Liv-, Ehst- and Kurlands, t.IX. Dorpat 1882. − MAX EBERT: Die baltischen Provinzen Kurland, Livland, Estland 1913. Prähistorische Zeitschrift, t. V (1913).
[8] JESSEN, op. cit., p. 41, with reference to the work of P. W. THOMSON

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It is of particular interest for us to note that in the south of Finland deposits are also known from the period of the Ancylus Sea.[1] That discovery was only made in recent years, and shows that it is necessary to

take into account a penetration of the ancient civilizations of the Stone Age that extends very far towards the north even in these regions, and on the other hand, that we must be very careful when we allege the absence of deposits in the vast spaces that extend towards the north and are still largely unexplored.

Following the northward extension of the Early Stone Age, we arrived at groups of civilizations that theoretically could have exerted an influence on the Finnmarkian in its more recent phases, but which, according to the chronology, cannot be its origin. On the other hand, precisely on the south and west coast of the Scandinavian peninsula, cases have been reported to which a fairly old date has sometimes been attributed, and which, in any case, it is appropriate to mention here. Firstly, there are the flints of Råö and Varberg in the vicinity of Goteborg (Sweden).[2] In layers of clay that are geologically linked to a very ancient time of the late glacial period, chance excavations revealed pieces of flint, many of which were recognized as being products of human labor belonging to an Aurignacian civilization. These pieces are of little significance. They are, for the most part, small, thick pieces, sometimes bare-shaped, or fragments of some kind that, following removal, have taken the appearance of thick scrapers, etc. Blades are absent, as are tools derived from blades, burins, and other characteristic instruments. There is nothing to compare these pieces with Finnmarkian tools. They were found in a reworked state; they are quite rolled and it is not impossible that they have been subjected to mechanical action.

Not far from these deposits is the Sandarna site near Gothenburg, which provided a significant number of tools, especially flint.[3] If we saw in this industry an offshoot due to the many backed bladelets that resemble the points of the Magdalenian of western Europe, it is especially in the Gravette or the tiny knife blades of the classic sites of western Europe western, a single corner burin with retouched truncation (transverse), an atypical notched point of the type from the Hamburg stage (Schwantes) and other small points with an inconspicuous notch, some blades with a beak or a burin point

[1] AARNE AYRAPAA: Der vorgeschichtliche Mensch in Finnland. Report of XVI International Geological Congress, Washington 1933 (1935).
[2] N. NIKLASSON: Råö och Varberg. Arkeologiska studier tillägnade H. K. H. Kronprins Gustaf Adolf (Råö and Varberg. Archaeological studies dedicated etc.) Stockholm 1932.
[3] JOHAN ALIN, NILS NIKOLASSON and H. THOMASSON: Stenåldersboplatsen på Sandarna vid Göteborg. Göteborgs Kungl. Vetenskaps- och Vitterhets-Samhälles Handlingar. (The Sandarna Stone Age sites near Gotheborg. Actes de la Société des Sciences de G.). Femte följden. Série A, t. 3, No. 6. Göteborg 1934.

obtained by retouching (the "Zinken" of the Hamburg stage). For the rest, the material is that found in many periods of the Stone Age: scrapers (on the end of a blade, core scrapers, keel-type scrapers, round scrapers on thin flakes), small knives, piercers etc. To this list are added three atypical tranchets, some axes with a circular section and a polished edge, and finally no less than 46 excellent and characteristic picks, of the Campignian type of kjøkkenmøddings! From pollen analyses, it also seems that the oldest layers of Sandarna are barely older than the oldest Maglemosian sites in Denmark, while the other layers are contemporary or more recent.[1]

An older date seems to be attributed to deposits discovered recently on the other side of the Swedish-Norwegian border, in the Østfold region south of Oslo, Norway. The findings are currently the subject of a study and we have not had the opportunity to analyze them. The only one published[2] is poor and testifies to an industry that is also uncharacteristic and yet archaic, at least for Scandinavia. What is certain in any case is that in Østfold there is a group of sites linked to a very high level. If we accept that these sites were related to the contemporary shoreline, they should belong to the Littorines stage of the Øyen Ocean (Nummedal), or, according to Tanner, to an average period of this stage, about at line d3 of his table[3] (halfway between d and Iε, in our fig. 45).

At Gjermungsnes in Romsdal, about halfway between Bergen and Trondheim in western Norway, the geologist Kaldhol collected flints in several places at levels of surprising elevation. Although they played a certain role in technical works or articles,[4] it is difficult for me, at the moment, to take sides on this subject, firstly because their deposit, in terms of archaeology, must be verified, then because the geological conditions associated with it are debatable and unclear. Provisionally, we can say that it is possible that we have here traces of the stay of man dating from an era that is

[1] See the observations of KNUD JESSEN in the cited study (1935), p. 38 et seq.
[2] A. NUMMEDAL: Et steinalderfund i Ski (A deposit from the Stone Age at Ski). Norsk geologisk tidsskrift t. 10 (1928−29).−See also: Universitetets Oldsaksamlings Årbok, 1933−34, p. 89 etc.
[3] TANNER 1930, note on p. 465.

[4] H. KALDHOL: Bidrag til Møre fylkes kvartærgeologi. III. Strandlinjeforskyvning under ældre del av stenalderen. Det Kgl. norske Videnskapers Selskabs Skrifter, 1924 (Contribution to the Quarternary Geology of the county of Møre. III. Displacements of the shorelines during the early periods of the Stone Age. Publications of the Royal Society of Sciences of Trondheim). Trondheim 1925.−see on this subject: TANNER: 1930, note on p.166. − A. BJØRN: Noen norske stenaldersproblemer (Some problems of the Stone Age in Norway), p. 60 etc. − R. NORDHAGEN: De senkvartære klimavekslinger i Nordeuropa (Climatic changes in the recent Quaternary in Northern Europe), p. 110.

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probably that of the Gotiglacial.[1] On the other hand, we will place an emphasis on a little group of deposits located in the same region of the coast. These are those that have been called "flintplasser" ("the flint-industrial sites").[2] These are also open air sites, with almost no stratigraphic indications. They generally seem linked to the shoreline of the time, which is more or less elevated above the current sea level. The civilization of the flint sites, known as the Fosna civilization, visibly extends over a fairly long period on the west coast of Norway and apparently corresponds to the Campignian. However, attempts at chronology have led to very different conclusions. A. Bjørn, in the work cited, made an in-depth examination of three sites of the county of Møre (in the neighborhood of the towns Ålesund and Kristiansund) which must be the oldest according to the artifacts collected and the level. The highest and richest of these sites is Christies Minde near Kristiansund. The inventory includes 15 atypical tranchets, 4 atypical picks, some core scrapers and other core scrapers (planes), a small number of atypical burins,[3] and finally many (30) tanged arrow points, sometimes rather wide, with the beginning of a notch or with shapes that are close to the Ahrensburg-Lyngby type, sometimes elongated, with a well-turned back. According to Bjørn, the latter are also the origin of some sub-triangular microliths of the site, with oblique retouch at the base and on one edge, where it was possible.

The Christies Minde site can be seen as a typical representative of this civilization, whose character, tools and technical processes vary, however,

[1] By attributing an exceptionally recent (interglacial) age to these finds, we were able to rely on the authority of Haakon Shetelig, who would have "characterized a piece as a Mousterian tool (scraper)" (BJØRN, p. 60, according to Kaldhol). Such an assertion, to be admissible, would require a thorough examination. But H. Shetelig never said anything like that. What he said verbatim is this: "The shapes especially resemble those of tools from the Mousterian period... Quite typical are, in your find, two modified flakes, a side scraper and a broken point drill. But I must make all reservations... So I don't think that your pieces can tell about the Mousterian, but it could be a primitive flint industry that resembles the Mousterian. (Letter to H. Kaldhol, June 27, 1924).

[2] Although these sites have never been the subject of an overall presentation, they have already given rise to an important literature. Let us cite in particular the following works: K. RYGH: Flintpladsene paa Trøndelagens cyst (The flint sites on the Trøndelag coast). Oldtiden II (1912). − H. SHETELIG: Primitive tider i Norge (Primitive times in Norway) p. 62 etc. Bergen 1922. − A. NUMMEDAL: Om flintpladsene (On the flint sites). Norsk geologisk tidsskrift VII. Kristiania 1923. − A BJØRN: Studier over Fosnakulturen (Studies of the civilization of Fosna). Bergens Museums Årbok, 1929, with bibliography.

[3] Thanks to the great kindness of Mr. Th. Petersen, curator of the Museum of the Society of Sciences of Trondheim, I was able to borrow the burins of Christies Minde and Byttingsvik, to study them closely. As for the latter site, from the artifacts I was able to see, it is doubtful that there are real burins. As for the former, the number of pieces (16) is very exaggerated. The parrot's-beak type of burin (Bjørn, fig. 17) is not represented, although this piece is undoubtedly a burin. The multiple burin from Drynjesundet (Bjørn, fig. 32) would not be discussable if it were not unique at this site.

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from one place to another. In reality − if we put aside a variable number of rather atypical tranchets, scrapers (scrapers on blades, core-form scrapers, a few typical keeled-scrapers), a few burins and a few geometric flints, probably a few Tardenoisian microburins, and a large point of the general type of Lyngby[1] − these are the small tanged arrowheads which, more than any other type of tool, characterize the civilization of Fosna. As a chronological point of reference they are of only limited interest, for they appear to have persisted well into the Stone Age of western Norway. Therefore, for flint sites, the geological levels must decide the age. Assuming that they truly correspond to the shores of their time, the most old among them − like Christies Minde −, inserted in the system of Tanner, will fall almost exactly to his level d (fig. 45),[2] which would correspond to a middle Finnmarkian period. This date also applies to another group of these sites that was discovered recently by a researcher in the coastal region near the mouth of the Trondheimfjord[3]. As Tanner's

level d marks the transgression of the Pholas Sea, which, according to him, "occurred a little before the transgression Ancylus Sea of the Baltic reached its maximum" (p. 217), it seems impossible to derive the civilization of Fosna from that of Maglemose. On the other hand, we can imagine a push of civilization towards the north, starting from the south coast of the North Sea, although a large part of this sea must have been dry land. It is certainly possible to admit a relationship with the civilization of Ahrensburg, which would explain in a reasonable way the origin of the small retouched points − the key type of the Fosna civilization. And there is no point in objecting that sites of the Fosna type are hardly known south of Bergen, because there are good reasons to suppose that they can be covered by the sea at its current level.

According to another hypothesis, vigorously defended by Bjørn in the cited work, this west coast civilization would be derived from the Finnmarkian, at a time that he supposes to be the last in its evolution. This explanation is also possible, although in this case the relationships must have started from an earlier period than Bjørn supposes, that is to say, at least, from that of the Finnmark sites located above of level d. But for the moment it comes up against the difficulty that the civilization of Fosna, according to what we know of it so far, does not go beyond Helgeland in the north, and that the Finnmarkian does not go further to the southwest than western Finnmark. In the space that

[1] L'Anthropologie, t. XXXlV (1924) p. 110 etc., fig. 3.
[2] TANNER 1930, p. 287, 467.
[3] TH. PETERSEN: Oldsaksamlingens tilvekst 1934 (Acquisitions of the Antiquities Collection) p. 8 etc. Det Kgl. norske Videnskabers Selskabs Skrifter. Museet. Trondheim 1935.

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goes from about 65° north latitude to about 70°, we have not yet succeeded in finding the slightest trace of these civilizations, although Nummedal, during several summer campaigns, methodically explored large areas of this coast.

Having thus sought to draw a picture of the ancient Stone Age in northern Europe and Scandinavia, let us return to Finnmark to ask ourselves with which of these groups it is appropriate to relate the civilization we are dealing with. Our starting point will be ensured by the geological landmarks and by the character of the Finnmarkian.

And first of all, for chronological reasons, it is clear that we can immediately rule out the Maglemosian civilization and that of Kunda, and naturally also the Campignian group of kjøkkenmøddings. If these groups had no connection with Finnmarkian, it must have been at a late stage of its development. However, definitive evidence of this influence is difficult to find. The tranchet cannot have come from there, because this type of tool is already fully formed in the sites that are probably the oldest in Finnmark. If we want to find civilizations that could have served as a starting point for the Finnmarkian, we must in any case go back to a date that corresponds to a relatively ancient period of the Finiglacial. It is possible that we will have to go back even further, both because the levels of the most ancient deposits in Finnmark were already formed in the Gotiglacial period according to some geologists, and also because we have probably not yet discovered the oldest of the sites in Finnmark.

Precisely specifying the period using the deposits themselves is impossible, due to their special character. We have pointed out many times that Finnmarkian tools contain at least two apparently irreconcilable elements: on the one hand a macrolithic industry of Mousterian character, and on the other hand a lighter industry bearing the mark of the Upper Paleolithic. Added to this is a poorly developed industry of microlithics from the oldest sites. This mixed character can be explained in three ways. Either it is due to the successive influence of cultural complexes to which these various elements belonged at various times. Or the Finnmarkian came from the coast of the Polar Sea with nearly the entire repertoire of tools that we know. Or it arrived in the form of a blade industry supplemented by a micro-industry, then it gradually developed on site to a heavy industry corresponding to forms of lifestyle and specific needs. A fourth explanation hardly merits serious discussion, due to the forms that we suppose to be the most recent developed locally, without influence from outside. Which of these three hypotheses is closest to

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reality is difficult to say. In the last two cases, it is the most recent element that is decisive from the point of view of chronology and human geography. In none of the three cases can this element be neglected. Particular attention must therefore be paid to the microlithic element of Finnmarkian tools. Undoubtedly, in all respects, the micro-industry is of secondary importance, if we compare it to the large one, and moreover, it is in reality less important than our photographs would lead us to believe. But Finnmark's small industry is

not actually a micro-industry in the exact sense of the word. It is most often the shapes of larger tools that reappear in the most of the types that we have (scrapers, burins, backed or notched blades etc.), but have reduced dimensions. Geometric flints of Tardenoisian character are not represented there. The only pieces that suggest this (fig. 42e, and pl. CIV, fig. 495) are completely unique specimens. It is also necessary to mention some bladelets with oblique truncation − short bladelets of which there are only 4 specimens, at Tollevik (fig. 40a, b) and elongated bladelets that are pure exceptions at different sites (fig. 30c). But these are forms which, in the north of the continent, not only belong to the Tardenoisian, but also go back to the late Magdalenian. Likewise, the Tardenoisian microburin is not represented in the Finnmarkian either. The microlithic industry of this civilization is characterized above all by small tanged points, of which there are various varieties, without it being possible to establish a chronological difference between them. The extreme forms are, on the one hand, the elongated bladelets, with backs and tangs, which we know from the Chwalibogowician and partly from the Swidsrian, and, on the other hand, the larger pieces, with an almost triangular leaf part and oblique truncation, which sometimes can resemble the Ahrensburg type, and also resemble the Lyngby type. At a single site (Steinseng), three arrowheads were found with the broad triangular leaf that characterizes the Lyngby points (or perhaps just as much the Font-Robert type). The same shape is found, very enlarged, at other sites. Related to these pieces are the more elongated points with unretouched leaves, more or less wide, such as are found in the very recent Magdalenian and in the so-called transitional civilizations to the south of the North Sea and the Baltic Sea. Since geometrical flints do not exist in the latter, and since the shapes of points that we have mentioned in Finnmark appear in sites that must belong to the oldest layers according to their levels, it is possible that we have here a reference point of primarily chronological value.

But this data only applies to the restricted element represented by the micro-industry. It does not follow, from what we have said above, that it has the slightest significance for the other, much more important, elements of the tools

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of the Finnmarkian, which we naturally cannot neglect in the examination that follows.

When looking for parallels to the Finnmark deposits, a quick glance is enough to show that their industry does not resemble France, nor generally western Europe. In the preceding pages we referred to the types of these regions, because the French material is that which I know best by experience, because the French works are the most accessible, and also − and above all − because France is the classic land of Paleolithic research where the typology of the Stone Age to the Ice Age has been most firmly defined. As it is above all a question for us of specifying the character of individual types and of industry in general in the civilization of Finnmark, it was natural to refer to French models. But, apart from the fact that the heterogeneous tools of the Finnmarkian are as little French as possible, due to the distance and geographical conditions in general, it is natural to look elsewhere for the origin of this civilization. Finally, we also have to take into account the fact that along the Norwegian coast, which is quite well explored, we have not found any deposits that could be presented as intermediate links with the Finnmarkian.

The industry that according to its general characteristics offers the most resemblances to the Finnmarkian, is, without a doubt, that of China, of which we have spoken, and even more that of Siberia. There, we similarly find a civilization of heterogeneous tools with archaic forms, which especially in Siberia, are rediscovered in a relatively young environment. As the Siberian Paleolithic allows us to fix dates with some freedom, it is possible or probable, that it belongs to about the same period as the Finnmarkian. The general resemblance of the tool technique in the two groups of deposits, reawakened the old theory of repeated migrations of peoples from Central Asia towards the west of the European continent, and it was also applied to the civilization of Finnmark. Thus, we saw in this a phenomenon parallel to the hypothetical extension of either the Aurignacian or the Magdalenian from Asia to Europe. Without wishing to completely reject this convenient working hypothesis for the late glacial period that A. Bjørn proposed in several articles[1] I will however indicate one or two reasons that hardly allow me to adopt it. Let us first point out the enormous distances that separate the groups of Asian deposits from Finnmark. The Yenisei deposits are found up to 57° north latitude and 92° east longitude, and those of Finnmark are found at 70° north latitude and only 30° east longitude. About three thousand five hundred kilometers separate the easternmost

[1] A. BJØRN: Noen norske stenaldersproblemer (Some problems of the Stone Age in Norway), 1928. − Hovedlinjer i den norske nations tilblivelseshistorie (The major lines of the formation of the Norwegian nation). Naturen, 1931.

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Finnmark sites and the westernmost group of Siberia, near Krasnoiarsk. It is a distance like that from Finnmark to Asia Minor or to the South of Italy, or double that which separates Oslo from Paris... assuming that the migratory peoples would have followed the straight line through so many natural obstacles, such as the glacier that perhaps covered the Urals and the region north of the Urals towards the Polar Sea. In my opinion, moreover, for reasons that I have already cited, it is more than doubtful that we can report, for the Upper Paleolithic, a migration from Asia to Europe or an important cultural influence. The deposits, at least as we know them today, hardly allow such an interpretation. In reality, it should be embarrassing to constantly seek the origin of the complex cultures of Europe in influences and repeated migrations, coming from the interior of an unexplored or still poorly explored Asia. All things considered, each cultural element, down to the simple forms of tools, must have been invented somewhere, and it is not necessary that it be precisely in the regions where the history of man is least known, although this is a convenient way of getting around the difficulty.

But then, despite a noticeable general resemblance, the tool industries in Finnmark and Siberia, are by no means identical, and it seems, especially, from the reproductions I have at hand, that the small-scale industry is very different. The similarity is limited first to a very general archaic character, then to forms of tools found in a host of civilizations, and finally to special forms such as a few rare instruments of percussion of the general type of punches, hammers and Mousterian points. But among all the types of instruments, it is the last three that appear most easily − through the effect of a new creation, or if you like, of a mutation − when the conditions of existence require heavy tools and, even more so, when the poor quality of the stone influences the shape of the tool, as in Siberia and Finnmark. The long persistence of the punch is explained more and more easily, and percussion instruments of the punch type are found at very different periods. Mousteroid points and scrapers exist in greater or lesser numbers throughout the Upper Paleolithic,[1] and in addition, this last type at least is found sporadically much later still.

After examining all the data in the problem, it seems more natural to look for the origin of Finnmarkian in a region located at a reasonable distance. Reviewing the ancient stone civilizations of central Europe

[1] Following his research on the Stone Age in Italy, M. R. Vaufrey warns researchers against the temptation to attach too much importance to precisely these forms of tools. R. VAUFREY: Le Paléolithique italien, p. 134. Archives de l'Instutut de Paléontologie humaine. Mémoire No. 3. Paris 1928.

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and the north, we have seen that we cannot find direct parallels to Finnmarkian civilization. None of the groups of Stone Age sites in these regions possesses quite the heterogeneous complex of tools that we find especially in Finnmark. But on the other hand, we do not need to go so far to find Stone Age civilizations that offer more or less perfect parallels with certain elements of Finnmarkian tools, and a point of departure for the others.

Recalling what we have said about micro-industry, let us begin by drawing the reader's attention to the Ahrensburg-Lyngby group of deposits. Probably nowhere can we find a more exact match with the microlithic industry of Finnmark.

In the Ahrensburg-Lyngby group, as in Finnmark, in addition to tanged points − with oblique retouch of the leafy part, or with a more or less characteristic dorsal retouch, or even with the beginning of a notch − we have small, simple, tanged tips on lamellae, with a tang in the axis of the piece and a leafy part without retouching. In addition, arrowheads of the Lyngby type are found at Steinseng (pl. CIV), and, with enormous dimensions, in the quartzite industry at Vedbotneidet and other sites. In both areas, the retouch is a typical abrupt retouch. Geometric flints are missing at both places, with the exception of sporadic samples of obliquely truncated bladelets. The presence of burins, core-form scrapers, etc. in both groups of deposits is perhaps less important although it still adds to the resemblance. Let us also point out that in Ahrensburg, as in the recent Magdalenian and in general in earlier transitional civilizations, we note the beginning of macrolithic industry, marked especially in Ahrensburg by the large "Breitklingen", not very different, in reality, from the Mousterian group of flakes and large blades from Finnmark. What importance should be given to this last feature is another question; but what is certain is that the concordance of the microlithic industry is great enough for us to be tempted to derive at least this element from the Finnmarkian, from the groups of deposits in the south of the North Sea. According to the chronology, nothing stands in the way. And in fact, it is likely that the physical conditions were much more favorable than is generally believed for expansion northward across the Skagerak and the North Sea.

Little by little, we seem to be realizing better that the North Sea, for long periods was a dry land[1] much more than previously believed. Perhaps this entire sea was once reduced to a channel about 70 km wide, at the place still occupied today, at the very edge of the coast, by the Norwegian submarine deep ("den norske

renne"). The

[1] See a very interesting study by R. G. LEWIS: The Orography of the North Sea Bed. The Geographical Journal, v. LXXXVI, London 1935. Map on p. 337

people who lived on the south bank of the channel could see land to the north and had no difficulty crossing such a strait, where the strength of the winds and currents was relatively weak. It is difficult say exactly what the respective position of the sea and the land were at the time that concerns us. However, what seems certain[1], is that around the Allerød period, the land on the Norwegian side of the channel had an elevation about 20m lower than that of today, and that consequently, the floor of the North Sea was much higher than now, because of the seesawing movement that was occurring with the Norwegian Channel as the hinge. Even at the time of the Ancylus Sea, large areas of the North Sea were dry land, as evidenced by the bogs found at the bottom.[2] We are thus led to suppose that in southern Norway there was immigration from Holstein-Jutland during the period that interests us. Later, as the land subsided, the sites on the south coast of Norway would have disappeared below current sea level. It is very likely that we will never discover them. On the other hand, it is natural to see a result of this expansion in the ancient Stone Age sites of the Østfold region, and in our opinion, the same remark also applies to the civilization of Fosna on the west coast of Norway, where the uplift of the land happened differently than in the south of the country. We completely agree with A. Bjørn in thinking that this civilization cannot come from the Danish civilization of Maglemose. The chronology is against this, as we have already seen. But it is likely that it received impulses from them at a later stage.

However, it is quite difficult to admit that this expansion from Holstein-Jutland could have spread as far as Finnmark. We think less here about distances, although they are also important. What is more serious is that all along the coast we have not found a single site that by its character and its date could serve as a transition. The west coast of Norway has been the subject of archaeological research for so long that this gap cannot be overlooked.

Under these conditions, it is difficult, for the moment, to assert that the Finnmarkian came from the west, and we are almost obliged to admit an expansion from the east of the Scandinavian peninsula. It would be useless to investigate here which cultural horizons may have disappeared following the transformations undergone by the

[1] KNUT FÆGRI: Quartärgeologische Untersuchungen im westlichen Norwegen I. Über zwei präboreale Klimaschwankungen im südwestlichen Norwegen. Bergens Museums Årbok, 1936, No. 8. I thank Dr. Fægri for allowing me to read proofs of this work.
[2] See e.g. G. ERDTMAN: Some Indications of the Character of Climate and Vegetation in North-western Europe during the Mesolithic Age. Proceedings of the First International Congress of Prehistoric and Protohistoric Sciences; London 1932. (London 1934).

sea and land on the east coast of Sweden. We will take as our starting point the situation on the continent, to the south and east of the Baltic Sea. Here we must first remember that a certain importance has been given to the Swiderian, in relation to the civilization of Ahrensburg and that of Fosna, as well as in relation to the Finnmarkian. I must admit that, for my part, it is difficult for me to agree with this opinion, firstly because the "Proto-Solutrean" retouching of the Swiderian does not characterize the three groups of civilizations that we have just mentioned, and secondly because the leading type of the Swiderian − the narrow tanged lamellae and blades − is quite different from the tanged points we find in these three groups. This difference seems to manifest itself especially when we compare the Swiderian to the civilizations of Ahrensburg and Fosna, while between the Swiderian and the Finnmarkian we can perhaps discern a certain resemblance. On the one hand, in fact, we find a limited number of small points that can be compared to those of Finnmark.[1] On the other hand, the Finnmarkian offers some rare examples of a flat retouch, like the "Proto-Solutrean" retouch of the Swiderian. We can, for example, compare our small points (fig. 31d and 34a) with pieces such as by Sawicki (pl. XIX, fig. 3; pl. XXIV, fig. 5 etc. −1935). A much greater resemblance exists between the microlithic industry of Finnmark and that which we find in the Chwalibogowician (which has also been cited in connection with the three groups of western and northern deposits, and whose outline appears more clearly since Sawicki distinguished this civilization from Swiderian). In reality, it seems that it is in this civilization that we find very close parallels with most Finnmarkian microliths. Thus, on pl. XXII of the cited work of

Sawicki (1935), we see not only an almost complete selection of the tanged arrowheads that we know in Finnmark, but also bladelets with straight or curved blunted backs. The retouch, judging from the publications, seems to be rough, but is accompanied by a Proto-Solutrean retouch on the lower surface of the tang. Similarly, in the civilization of Nowy Mlyn, from which Sawicki derives the Swiderian, we find[2] a many forms that correspond to those of the Finnmarkian, among others blade-knives of the general type of Châtelperron or Abri-Audi, which are rarely missing at Finnmark sites.

It is therefore − and this is important − in the eastern regions that we most easily find the conditions that explain not only the microlithic industry, but also the macrolithic element of Finnmarkian tools. It is not necessary to bring into play the Mousterian or primitive Aurignacian element of Moravia, which nevertheless, undoubtedly offers perfect parallels

[1] L. SAWICKI: L'industrie swidérienne etc. (1935), pl. XI, fig. 6.
[2] Sawicki 1935, pl. XX, XXI.

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with several types of archaic tools from Finnmark. But we undoubtedly have the best reasons to look for the origin of the Finnmarkian in the Upper Paleolithic of Russia. I admit that it is very difficult to get an exact idea of all the tools from the Russian deposits, because of the scarcity of reproductions that illustrate the published works on this subject. We also have the impression that it is above all the purest and most "beautiful" types that have been shown, that is to say those which, in the present case, offer us the least interest. But Russian specialists such as P. Efimenko energetically emphasize the conservative nature of the Upper Paltiolithic in Russia, the long persistence of archaic tool types. And we saw above, in Russia this civilization kept an Aurignacian character. Just in the figure on page 91 of the often cited work of Efimenko,[1] we find at Borschevo I an almost complete selection of forms that correspond to those of the small-scale Finnmarkian industry. These are small tanged arrowheads, with the beginning of an abrupt retouch, backed bladelets, points of the type from Châtelperron or Abri-Audi, burins and scrapers. By analogy with the western sites, we connect Borschevo I in the late Aurignacian-Solutrian. But Efimenko then cites (p. 102 etc.) many sites that have a poor and crude industry, with a considerable number of archaic burins that he nevertheless dates from the Magdalenian period. Without the circumstances allowing us to prove it in detail, let us say that it is possible that the stone industry in Russia, at this time, evolved strongly towards a macrolithic industry, which moreover is more or less the case for the final Magdalenian further west. It is therefore in Russia that, perhaps, we can find the origins of both the coarse and light industries of Finnmark, and even the microlithic industry, although, for the latter, it is necessary to consider possible contributions from civilizations located further to the west.

Even assuming that the Finnmarkian came from the west or the center of Russia, it is necessary to note the absence of any site over a fairly large area, according to the situation of the deposits known today. But Russian sites of the Upper Paleolithic already reach 55° or 56° north latitude. There fauna of the Ice Age, with the mammoth as a characteristic representative, was observed towards the north at least up to the heights of Waldai, near the sources of the Volga, southeast of Leningrad.[2] From there, it is hardly more than 1000 km to the most eastern deposits of Finnmark. And unlike what is the case for the west coast of Norway, here it is of an area that is more or less "terra incognita" from an archaeological point of view; in addition, this region is so poorly cultivated and so sparsely populated

[1] Die paläolithischen Stationen der osstrussischen Ebene.
[2] EFIMENKO, op. cit., p. 84.

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(in the region of Archangel in 1920, there were only 0.6 inhabitants per square km) that the discovery of a deposit would be a pure chance, even if the population had its attention turned in that direction. Here therefore, one has a much greater chance, in all respects, of finding unknown deposits than on the much frequented narrow coast of Norway; and proof that this must indeed be so is that very recently sites have been discovered from the era of the Ancylus Sea in the populated and cultivated regions of southern Finland.

A priori, it is inadmissible that the populations of the Ice Age, especially in Russia, did not pursue game towards the north, and it does not seem doubtful to me that the future will bring us conclusions very different from those that are accepted today concerning the extension of the Paleolithic and of the Sub-Paleolithic civilization. Efimenko also thinks that this is probable (see the cited passage).

In these vast open regions, we do not consider the obstacles of the mountains or the sea. And the slow-moving rivers, on the banks of which the Paleolithic people of central and southern Russia preferred to live,

constitute natural and almost uninterrupted communication routes from the Black Sea to the Polar Sea. Let us not forget either that these areas were easily accessible at the very beginning of the Late Glacial period. Undoubtedly, we do not yet know exactly where the front of the glacier passed in northern Poland during the last ice age. But its external frontal moraines are believed to be recognized in Lithuania and in the Waldai mountains, and from there it continued a straight line in the direction of the White Sea. In the east, the lands were free of ice, accessible to man, even during the ice age, but especially when the glacier had started to melt. And it must be remembered that here − unlike what happened on the coast of Norway − a developed navigation technique was not necessary to cover fairly large distances in a relatively short time. It is not even necessary, strictly speaking, to assume a significant cultural delay here.

In reality, precisely in Russia, nature itself offered exceptionally favorable conditions for migration to the north. This remark applies to the entire plain that extended between the edge of the glacier and the vicinity of the Urals; but we think above all, and quite naturally, of the Onega and the Dvina rivers that have their source in the immediate vicinity of tributaries of the Volga, only 4 degrees of latitude north of Paleolithic sites that have been discovered on a tributary of this great artery of human travel.

It is therefore above all these western routes that were naturally offered to the peoples of western Russia and Poland for migration towards the North; and it was the regions of the White Sea where this migration was to reach first. It is quite possible that, in the future, we will see that Finnmarkian is a coastal civilization that at more or less remote stages of its history

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spread to the Russian coasts of the Polar Sea; but, in our opinion, it is along the White Sea that we must look for the intermediate sites between Finnmark and the Paleolithic civilization whose northern front appeared to us at some distance to the south. The deposits of Finnmarkian character that were discovered a few years ago in northern Finland do not have much significance in this respect, but they are steps on the right path. On the other hand, we await with the greatest impatience the results of the research that Soviet Russia has undertaken in the north. Already, as we write these lines, a letter announces "Paleolithic" deposits in the Kola peninsula. What exactly they are, we do not yet know. But if they meet our expectations, they are perhaps an important step in the direction that we wanted to follow here as being the best for the moment.

Perhaps the discoveries made in these regions will dispel our embarrassment and teach us where, how, and when this curious mixed civilization of Finnmark was born. In the preceding pages, we have tried to show that the supposedly most recent elements of the Finnmarkian have parallels further south in civilizations that can be linked to the late Magdalenian or the pre-Tardenoisian. And in Finnmark, this industry occurs at sites that are not necessarily much newer. This undoubtedly limits our certainties and we can only make assumptions about the way in which heavy industry penetrated these same sites. But we can at least observe that the necessities of existence have posed entirely new problems to the populations of the tundras and steppes, accustomed to sleighs and rivers, from the day they chose the coast of the Polar Sea as their residence. And it would not be absurd to think that the change of existence, the new species of game and in general the new conditions of hunting and fishing had as a consequence a partial transformation of the previously used tools and weapons. To this extent, we can admit a renaissance of the large tool industry in the late glacial period on the coasts of the Polar Sea, and all the more so since this trend already existed in the civilizations where, according to our hypothesis, we can look for the origin of Finnmarkian. But this return must be before even the oldest stages of Finnmarkian as we know it today. This reasoning also applies to the east, that is to say to the regions where hunters from the continent first saw the Arctic Ocean and were obliged to adapt their hunting technique to the conditions of the Polar Sea.

But there is no point now in continuing this discussion. And it also seems pointless to me to study the ethnological problems that may arise in connection with these deposits: who were these hunters? Do they have descendants in today's circumpolar population and if so who? According to the character of

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deposits and the conditions of settlement in Finnmark,[1] there is only material for speculation and uncertain theories, especially as long as we cannot establish a continuous sequence between the Finnmarkian and the later civilizations of the Stone Age.

* * *

To conclude, it may be appropriate to say a few words about the possibilities of existence in Finnmark during the late glacial period.

The country that the Finnmarkian tribes saw in their travels was undoubtedly not really very different

from what the Finnmark coast is today. The glacier, it is true, covered the interior of the land with an enormous icecap, but on the coast it had melted and retreated further than the ends of the fjords; the rivers with green glacier water had already found more or less their current routes. Between the ice front and the sea stretched the land that the glacier had worn away, covered everywhere, as the Finnmark plateau still is, by glacial sands and cobbles, while on the coast and in the fjords the same moraines and terraces as today, or almost, were visible to the eye. The sea, in places, penetrated the land deeper than now, and perhaps the ice floe was very close to the shore, as currently on the coasts of Greenland. Already, this bare land supported vegetation that perhaps began to nourish the first representatives of an Arctic fauna.

The difficulties offered by the climate are easily exaggerated by those who do not know Finnmark: living at 70° north latitude seems a terrible thing. Without doubt, it must be admitted that the climate was harsher than now, perhaps even much colder. What average temperature did Finnmarkians have to live with? It is naturally impossible to say; but we find an indication in the fact that towards Æresund (Denmark), in the month of July, the average temperature was from 10 to 14 degrees, during the Allerød period, that is to say the oldest to which our sites could belong. Nowadays the corresponding figure (for Copenhagen) is 16.6°.[2] A drop in temperature of 3 to 5 degrees would, in our regions, be a catastrophe for a population that feeds on the land, but less dangerous for a primitive population of hunters and fishermen. On the coast of Finnmark, the warmest month of the year, currently has an average temperature of 8.6° and the average for the whole year is 0.5 to 1°, on the whole coast from Vardø to Alta. Important fact: the coldest month has an average temperature of only -5.6° at

[1] An in-depth exposition of the question of settlement in Finnmark in ancient times has been made by GUTORM GJESSING: Fra steinalder til jernalder i Finnmark (From the Stone Age to the Iron Age in Finnmark). Instituttet for Sammenlignende Kulturforskning, Série C III−3. Oslo 1935.
[2] JULIUS HANN: Handbuch der Klimatologie, t. III, 2ème partie, p. 193. Stuttgart 1911.

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Vardø, and the lowest temperature observed there is -21.6°, and the maximum is 25.8°. If we also remember that the coast and the greater part of the fjords in Finnmark are never frozen during the winter, and that the pack ice is only found very far out to sea, it will easily be understood that this country has a very stable temperature, and overall, an exceptionally favorable climate. The reason is the existence of the Gulf Stream and the supply of warm water that gives the sea an average temperature 4 to 5 degrees higher than that of the atmosphere along the coast. Thus warmed, the country is still habitable today, and it is perhaps not an exaggeration to think that it was more or less like this at the time of the Late Glacial, because the fairly rapid melting of the ice suggests a reasonable temperature, at least during the summer.

All things considered, we can venture to say that the climate in Finnmark was far from offering insurmountable difficulties. In any case, the people who lived on the front of the glacier, in the steppes of central Europe and Siberia, had to adapt to otherwise considerable temperature changes and, above all, to get used to infinitely long and rougher winters. Man's adaptation to cold is almost unlimited; This is what modern primitives who live in the most rigorous climates teach us. Likewise, in the Arctic regions, we can manage with a minimum of artificial heat. The fuel available to the Finnmarkians was primarily oil and fat from the sea animals they had killed. As for forest resources, it is difficult to imagine their existence in Finnmark, at least during the oldest phase of the Finnmarkian. But it is very possible that without great difficulty they found the wood they needed for sleds, tent poles, etc., for tools and sometimes for weapons, and even for heating. We are well aware of the role that driftwood has played and still plays for the forest-deprived inhabitants of the polar regions. In Finnmark too, the sea has carried floating tree trunks onto the beaches for as long as we can remember. According to Helland,[1] there has been collected, in addition to the Norwegian fir (Picea excelsa), other kinds of trees, above all the American larch (Larixa americana) that forms entire forests in the north of St. Laurent in Labrador, but also the pine of the Canary Islands (Pinus canariensis), of Teneriffe and the neighboring islands. The quantity of these floating trunks naturally varies over the years. Sometimes "the sand of the beach can be turned into a dock of driftwood" (Helland, p. 223). In 1927, when there was more driftwood than usual in Finnmark, it was collected over large areas of the coast, and in Vardø alone, 200 trunks. Edv. Havnø,[2] who wrote a notice on this wood, tells us that it is visibly worn by ice, sometimes

[1] Norges land og folk (Norway, country and people); t. XX, p. 222 etc.
[2] EDV. J. HAVNØ.: Drivtømmer i Finnmarkshavet (The floating wood on the coast of Finnmark), Naturen, 1927, Bergen.

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broken, without bark or branches, but sometimes retaining its roots. Havnø believes it can be confirmed that it comes from a forest located at a very northern latitude. "It is small, and its thickness is most often 15−25 cm. Rarely it reaches or exceeds 30−40 cm. The trees must have been both small and sparse, gnarled and twisted. They must have grown on poor, shallow soil and perhaps always frozen, because we never see a taproot, but on the contrary, on all species of trees, the roots spread out on all sides." Havnø supposes that these woods were carried from Siberia by the ice floe, and he is undoubtedly right, because the Siberian larch (Larix sibirica) provided a fairly large number of the samples that Havnø sent to the Bergen Museum.[1] Nowadays, the coast of Finnmark therefore receives driftwood coming from many different countries, and if the currents at the time of Finnmarkian were about the same as today, the peoples, whose number was probably not considerable, had plenty of wood even for heating. That these contributions of driftwood date back to very ancient times is a certain fact, since we often find them inside the lands, at the bottom of the peat bogs, that is to say in the only place that offers good conditions for conservation. This "Noah's wood", as it is called, is driftwood that was washed ashore in ancient and prehistoric times, when the land was at a lower level than today in relation to the sea.

The big job for the Finnmarkians, as for all primitive peoples, was to find daily food. Following the general law that dictates that the species of animals become less numerous as one advances towards the north, but that the number of individuals is considerable, the fauna of Finnmark is not varied, but the mass of animals − terrestrial or marine − that can serve as food for man is always impressive. On land, among the fairly large animals that still live or that were only eliminated during the last century, the beaver, the bear and the elk belong to the forest. For the Finnmarkians, they could play absolutely no role. On the other hand, it is extremely probable that they fed on wild reindeer, because it is assumed that this animal must have existed in the region at a very early period of the melting of the ice. It was able to live permanently on the coast, or even move in herds towards the north, to the edge of the ice-free lands, to find new pastures, fresher air and shelter against annoying insects, such as the caribou of Canada still does it today.[2]

[1] I have this information by the kindness of Dr. Knut Fægri.
[2] An extraordinarily lively and instructive description of the caribou and the life of the caribou-hunting Indians was made by Helge Ingstad, who himself lived alone with a tribe of "Caribou eaters". HELGE INGSTAD: Pelsjægerliv blandt Nord-Kanadas indianere. Oslo 1931. The book was translated to English, under the title: Land of Feast and Famine (London 1933), and into German: Pelzjägerleben in Kanada (Berlin 1933).

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An example that illustrates both the sobriety of the reindeer and its traveling skills is the Svalbard reindeer (Svalbard is the Norwegian name for Spitsbergen). There we still find the remains of an ancient, prodigiously rich herd of reindeer. The animal differs in its appearance from all other known varieties of reindeer throughout the world,[1] and must, therefore, be very ancient in this country. Long ago, the first reindeer came passing over the ice. Today again, it is noted that in their travels, reindeer arrive from Asia to Svalbard via Novaya Zemlya.[2] In Finnmark, the wild reindeer was known throughout the historical period, until the beginning of this century. Its demise is due to the same factors that currently threaten to gradually annihilate the few herds of wild reindeer in southern Norway, that is to say the breeding of domestic reindeer and the absence of hunting control. The reindeer were killed either by setting of traps, or by running. To take them, sometimes a domestic reindeer was used to attract wild reindeer. This custom is very old and is mentioned in the oldest historical texts. Ottar, who lived south of Tromsø in the 9th century, had six reindeer of this kind and he speaks of them as animals of great value; we conclude that hunting wild reindeer was of great importance to him, although he owned six hundred domestic reindeer, not to mention stables full of oxen, cows, sheep and pigs. One used, as everywhere in the past in Norway, traps to capture the reindeer: these were walled pits, almost two meters long and half a meter wide, that were dug in the passes and places frequented by wild reindeer, fixing in the bottom a lance or a strong pointed spear to kill the beast or skewer it. It is also a method both effective and simple and it may well have been used by the most primitive peoples. Furthermore, we must admit as certain that all people hunted with dogs. This is how deer were still hunted in southern Norway until around 1700,[3] and it is assumed that this custom makes it possible to explain, at least partially, the rock engravings from the Stone Age, because their subject is mainly animals that were hunted for food and we find them more than once in places that seem to be traps.[4] But no country lends itself more naturally to this hunt than the coast of Finnmark. We are tempted to exaggerate the difficulty; but in certain cases it is extraordinarily easy to slaughter reindeer, when they move en masse and the herd is lured into the water where the hunters

[1] R. COLLETT: Norges pattedyr (The Mammals of Norway), p. 510. Kristiania 1911−1912.
[2] ADOLF HOEL: Hvorfra er Spitsbergenrenen kommet? (Where did the Spitsbergen reindeer come from?) Naturen, 1916.
[3] A. W. BRØGGER: Kulturgeschichte des norwegischen Altertums, p. 94. Instituttet for Sammenlignende Kulturforskning. Série A, t. VI. Oslo 1926.
[4] JOHS. BØE: Die Felszeichnungen im westlichen Norwegen I p. 44. Bergens Museums Skrifter, No. 15. Bergen 1932

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in their canoes can kill them as they wish. This is currently how one hunts on the Arctic coast of the New World, and nothing was more convenient for the people of the Stone Age in Finnmark, if the animals were numerous enough to ensure a successful hunt.

The Finnmarkians no doubt had canoes, perhaps made of wood, but certainly made of skin. It was an absolute necessity for them if they wanted to take advantage of the riches of the sea. Because it was the sea above all that nourished them, as already proven by the establishment of our sites on the shore itself. It will suffice here to briefly recall what everyone knows about the riches of the sea from the coast of Finnmark to Svalbard. Salmon and trout abound in the lakes and rivers; cod and pollock as well as other fish along the coast. Also the walrus, the seal, which is very easy to capture in rivers or at sea; again the whale that sometimes ran aground, sometimes was chased ashore by killer whales. The whale can also be killed with weapons so primitive that it was not beyond the means of prehistoric men. Until the end of the last century, whale hunting was practiced with bow and poisoned arrows even south of Bergen,[1] and, ten centuries earlier, six men could kill 60 whales in two days in the surroundings of Tromsø, southwest of our sites. It is again Ottar who tells us this.

On the other hand, we will emphasize a less known source of food, but of considerable importance for the inhabitants of Finnmark at all times, and perhaps even more so as we go back through the centuries. These are the birds that swarm in the "bird rocks" and other familiar abodes, and which still constitute an important part of the diet of the inhabitants of Greenland. Like all subarctic regions, Finnmark has a rich bird fauna, despite massacres for thousands of years. Although there are nearly 200 species in Finnmark,[2] it is not the diversity that surprises, but the prodigious quantities of birds that are found on many points of the coast. A few years ago, tourist boats near the "mountains of birds" used their sirens to make them rise, and travel reports often spoke of "clouds of birds" or "flights like whirlwinds of snow".[3] These are for the most part birds of fairly large size and whose flesh is good, like the goose (Branta

[1] G. A. HANSEN: Hvalfangst ved blodforgiftning (Whale fishing by blood poisoning). Naturen, 1887. Bergen. − A. BARSNES: Kvalveiding i Skogsvåg (Whale hunting in Skogsvåg). Norsk Årbok, 1932.
[2] R. COLLETT: Norges fugle (The Birds of Norway), by Ørjan Olsen, with the collaboration of A. Landmark. Kristiania 1921.
[3] A lively and poetic description of the life of birds in the far north is that of CARL SCHØYEN, in an abundantly illustrated book: Fuglefjell ("Bird Mountains"). Oslo 1931.

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bernicla), the wild goose (Anser anser) and other species of geese; the eider (Somateria mollissima), the swan (Cygnus musicus); numerous varieties of ducks, gulls (Larus), and sea swallows (Sterna), not to mention the three-toed seagull (Rissa tridactyla), the common auk (Alca torda), the puffin (Fratercula arctica) and many others.

Most of the birds just mentioned nest on rocks, islets and mountains along the coast and the fjords in Finnmark. Of these roosts where birds, eggs and down abound, the largest is Sværholtklubben, the point that separates Porsangerfjord from Laksefjord; but there are also significant ones at Renøya and Hornøya, near Vardø (sites 30−31), at Tamsøya (near sites 50−51), in Kongsfjord (site 36) and Syltefjord (sites 32−34), not to mention a host of other smaller ones throughout Finnmark. The lodges of Renøya and Hornøya were until recently considered as marvels, and they belonged to the Commander of the Vardø fortress. Tamsøya's income was formerly collected by the Prefect of Finnmark, who thus received in 1870, 2 barrels of blackberries (Chamaemorus rubus) and 48 kgs of fine down (worth, at that date 1200 to 1400 crowns, i.e. 16 to 1900 francs in gold) as an annual tax fee. What these bird roosts can produce will be better understood if we consider that, according to Helland's report, 50,000 eggs are collected each year, not to mention the down or the flesh of the birds. This wealth is now monitored and exploitation is regulated and practiced reasonably. But for the people of the Stone Age who knew no rules, the "bird mountains" were a sort of enormous food supply, where they could gorge themselves on meat and also eggs in the summer. Let us add, for

completeness, that in good years there are around 100,000 white partridges (Lagopus), a subarctic bird living on land, that is certainly very old in Finnmark and that offered the early population an appreciable resource, especially since it is stationary, even in winter.

Overall, the question of subsistence did not cause difficulties in Finnmark, especially for a population that possessed a very developed and well-developed art of hunting, who had the unlimited resources of a virgin region. In summer at least there was an overabundance of food. Without doubt, winter presented more difficulties, in this respect as in others. But thanks to the sea, there could be no real and prolonged famine. Thus, the inhabitants of the coast of Finnmark found themselves in an infinitely more favorable situation than people of the frozen steppes or snow of Europe.

If, despite everything, one objects that the Finnmark of the Late Glacial period was not the Finnmark of today, it will be enough to recall what is happening in Greenland, or better still in Svalbard, in the neighborhood of Finnmark. We find there, at

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77° and 80° north latitude, the same fauna, with the difference that the bird species are often larger and stronger. The reindeer exists there, although it was subjected to mass killings in the past, when hunting was not controlled and Svalbard was "terra nullius". On land there are fur-bearing mammals and white partridges; in the sea is everything it can provide for food: seabirds, fish, polar bears, whales, and seals, especially seals.

And here we are again faced with the problem that is raised by our sites and our deposits, and to which the Finnmark fauna perhaps gives us the key. In the preceding pages, we have indicated that the Finnmarkians, according to the situation of the deposits in relation to ancient sea levels, perhaps ceased to exist at the late Glacial Period or at the very beginning of the Postglacial, and that we cannot find in those places a civilization that would be the direct continuation of it. If this remark is correct, there must be a certain reason for this, a cause due to natural conditions and diet that, undoubtedly, we cannot yet grasp, but which we should consider.

Let us make a hypothesis. Let us try for a moment to imagine what an animal like the seal in itself could mean for a primitive population of hunters. The answer is simple for those who have even only a superficial knowledge of Eskimo life. For them, the seal is everything. For certain tribes of Eskimos the seal is about what the reindeer is for the Lapp, or better still the caribou is for the caribou Indian. Where there is the ice floe, there we find the seal, and in its footsteps, the Eskimo. Therefore, it is not the relative mildness of the climate that is a vital condition for the Eskimo. It is the cold. History will provide us with a striking example here. When the Norwegians and Icelanders colonized Greenland towards the end of the 10th century, they founded two main towns in the very south of western Greenland: Vesterbygda further north, and Østerbygda near the southern tip of the country. There they continued to live as before, that is to say raising livestock. The sea was open, there was no ice floe and, as a result, the region was not habitable for the Eskimos, who lived further to the north. But towards the end of the Middle Ages the climate cooled, the ice floe extended southwards along the coast, and the Eskimos with it. They destroyed Vesterbygda around 1350, attacked Østerbygda for the first time in 1379, and now they hunt the seal where the Norwegians who had established Østerbygda perished a century later.[1] Such are the paradoxical differences that the same place can offer to the existence of two populations of different habits and civilization. What is

[1] See POUL NØRLUND: Buried Norsemen at Herjolfsnes. An Archaeological and Historical Study. Meddelelser om Grønland (Communications on Greenland), t. LXVII. Copenhagen 1924.

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death for one is a chance of life for the other. For the Arctic hunter, cold can mean life, and warmth can mean death.

Now let us imagine that the Finnmarkian people arrived in an Arctic Finnmark roughly similar to today's Greenland, with sea ice surrounding the coast. Let us then imagine them depending for their existence above all on an animal, the seal, and on the purely arctic fauna that accompanies seals. They adapted their life and their hunting technique to these new conditions. But this life and the adopted habits was only possible as long as the ice floe bordered the coast, that is to say as long as the climate was sufficiently cold. A period of milder temperature, with an ice-free coast, could on the other hand be a catastrophe for them, because they could no longer manage to feed themselves, or putting things at best, because there was a serious difficulty to overcome. They could overcome it either by adapting the hunt and its life to the new conditions − and this adaptation might easily attract the people to migrate to the west and the south, that is to say towards areas where it was easier to live with new habits − or by moving following the ice floe, the seal, and the purely arctic fauna. When we consider the extreme reluctance primitive people have to change their lives, This last

supposition is perhaps not the most likely one. And for future researchers, the question will undoubtedly be whether the continuation of Finnmarkian civilization should not be sought towards the east, in the Kola peninsula on the shores of the White Sea, and perhaps even further east, just as we think that it is in these regions that we are most likely to find the stages that immediately preceded the migration of peoples towards the north.

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Plate I. *(1)* see the original French pages
-West bank of the Grense-Jakobselv river. The sites *Prestestua I* and *II* are at the top of the ravine, on the left

(indicated by the arrow). In the plain in the foreground, are the sites from the recent Neolithic. Photogr. Bøe.
-Kirkenes. The site *Jernbanestasjonen* (the Train Station) is located near the white house indicated by the arrow. The site *Messen* is on the moraine, in the foreground. Photogr. Nummedal.

Plate II. *(2)* see the original French pages
-Seilmerket (the Signal) seen from the east. The site *Seilmerket II* is on the flat ground, in the foreground; *Seilmerket I* is located on the hill, to the left of the rocky ridge where the upper signal can be seen. Photogr. Nummedal.
-View of the terraces of Skitnelv. The site Skitnelv is on the height, below the upper terrace in the background. On the lower terrace, are the sites from the recent Neolithic. Photogr. Bøe.

Plate III. *(3)* see the original French pages
-The site *Smellroren* seen from the north. The explored terrain extends from the foreground, and descending to the man seen on the left. At lower levels, in the center of the photograph, are sites from the recent Neolithic. Photogr. Bøe.
-Syltefjord. The site *Hansemolla* is on the height, at the place indicated by the arrow. Photogr. Nummedal.

Plate IV. *(4)* see the original French pages
-View of the *Kattuglelva* terraces. The site is in the center where the ground is clear. Photogr. Nummedal.
-The site *Ekebergvika*, seen from the south. It is on the bulge of the ground where two men are seen. The curve of a very visible terrace extends into the foreground (middle). Photogr. Bøe.

Plate V. *(5)* see the original French pages
-Skjånes. The site is at the top of the slope (middle of the view). Photogr. Nummedal.
-The site *Valan*, seen from the north. The light line across the photograph is a terrace (*Tapes* shoreline). The site extends from where the man is to the foreground. Photogr. Nummedal.

Plate VI. *(6)* see the original French pages
-A terrace with the site *Bossekop I*, seen from the west. The archaeological pieces were mainly collected near the largest tree, in the middle of the photograph. Photogr. Nummedal.
-The site *Steinseng*, seen from the west, with Altagård in the background. The site starts from the edge of the terrace, on the left, and goes uphill. The light spot marks the center. Photogr. Bøe.

Plate VII. *(7)* see the original French pages
Fig. 1. *Prestestua I.* Small core of hornstone, reused as a scraper. (1/1).
Fig. 2. *Prestestua I.* Discoid core of quartzite with a roughly retouched striking surface (at the top, not visible in the figure). At the other end one sees a sinuous edge obtained by alternating flakes. (1/2).
Fig. 3. *Prestestua I.* Sub-rectangular tranchet of quartzite, derived from a wide blade, truncated on each side. (1/1).

Plate VIII. *(8)* see the original French pages
Fig. 4. *Prestestua I.* Wide blade, truncated at both ends and forming a double-edged instrument. Quartzite. (1/1).
Fig. 5. *Prestestua I.* Flake cut on both sides, suitable for use as a scraper. Quartzite. (1/1).

Plate IX. *(9)* see the original French pages
Fig. 6. *Prestestua I.* Flake of quartzite retouched on part of the edge, subsequently chipped. (4/5).
Fig. 7. *Prestestua I.* Broken blade, retouched on both sides. Quartzite. (4/5).
Fig. 8. *Prestestua I.* Small point with dorsal retouching. Quartzite. (1/1).
Fig. 9. *Prestestua I.* Double burin on core of quartzite, with retouched truncation (top). At the opposite end (bottom of the figure) one sees a cutting edge with small removals on both sides. (1/1).
Fig. 10. *Prestestua I.* Burin on large flake of quartzite. (4/5).
Fig. 11. *Prestestua II.* Small core of hornstone, perhaps reused as a burin. (1/1).

Plate X. *(10)* see the original French pages
Fig. 12−13. *Prestestua II.* Scrapers on the end of the blade, the base forming burins (fortuitous?). Hornstone. (1/1)_
Fig. 14. *Prestestua II.* Scraper, perhaps with opposing burin. Hornstone. (1/1).

Fig. 15. *Prestestua II.* Angle burin, of hornstone. (1/1).
Fig. 16a–c. *Prestestua II.* Blades of hornstone (core starts). (4/5).
Fig. 17. *Kobbholmfjord I.* Block of quartzite cut into a scraper or chopper on an edge. The opposite side was adapted for gripping. (3/5).

Plate XI. *(11)* see the original French pages
Fig. 18. *Kobbholmfjord I.* Massive flake of quartzite recut on a very heavy scraper edge. (1/2).
Fig. 19. *Kobbholmfjord I.* Burin scraper on flake of hornstone. (1/1).
Fig. 20. *Jernbanestasjonen.* Core of hornstone, reused as a scraper in two places. (1/1).
Fig. 21. *Jernbanestasjonen.* Flake of hornstone with faceted striking surface (bottom). Numerous chips on the edges and a well-characterized tick (top and right). (4/5).

Plate XII. *(12)* see the original French pages
Fig. 22. *Jernbanestasjonen.* Flake (of the "Clactonian" type). The striking plane (bottom and left of figure b) is oblique and smooth. The bulb is large. Retouches and chips on the edges. Hornstone. (4/5).
Fig. 23. *Jernbanestasjonen.* Sub-rectangular flake of hornstone, made by retouching on the upper side and by removal of the bulb on the lower side. The heel was maybe adjusted to facilitate fitting. (4/5).

Plate XIII. *(13)* see the original French pages
Fig. 24. *Jernbanestasjonen.* Mousterian-type tip with fine retouches on the right edge, towards the top. The base is thinned, perhaps to facilitate fitting. Hornstone. (1/1).
Fig. 25. *Jernbanestasjonen.* Triangular flake, chipped on the edges. Hornstone. (1/1).
Fig. 26–28. *Jernbanestasjonen.* Points as from Abri-Audi, more or less completely retouched on the left side. Hornstone. (1/1).
Fig. 29. *Jernbanestasjonen.* Mousterian-type flake of hornstone with facets on the striking surface and chips towards the top. A large recess at the base (right side) was perhaps used to facilitate fitting. (4/5).
Fig. 30. *Jernbanestasjonen.* Wide broken blade of the same character. There is fine retouching on the edge of the fracture at the top. Hornstone. (4/5)

Plate XIV. *(14)* see the original French pages
Fig. 31. *Jernbanestasjonen.* Flake of hornstone, retouched as a scraper on one edge (left of figure a) and scraper at the base. The scraper, and partially the scraper, were sharpened by removals on the lower face, with removal of the bulb (fig. b). (1/1).
Fig. 32. *Jernbanestasjonen.* Thin flake, well retouched on an edge, with small denticulations (saw?). (1/1).
Fig. 33–35. *Jernbanestasjonen.* Scrapers on the end of the blade, convex (fig. 33) and concave (fig. 35), the latter ending (top and left) with a point which may have served as a piercer. (1/1).

Plate XV. *(15)* see the original French pages
Fig. 36. *Jernbanestasjonen.* Elongated triangular flake whose base, in the fortuitous shape of a simple burin, appears to be thinned by removals on the upper face. At the top we see a finely retouched checkmark. The two points, on either side of this checkmark, seem to have served as piercers. (1/1).
Fig. 37. *Jernbanestasjonen.* Flake with beak or burin released by two marks, one of which is well retouched. The other is produced by a single removal on the lower top (to the right and top of fig. b) and slight retouching on the upper side (to the left and top of fig. a). Hornstone. (1/1).
Fig. 38–41. *Jernbanestasjonen.* Refinished blades of hornstone. (1/1).

Plate XVI. *(16)* see the original French pages
Fig. 42–43. *Jernbanestasjonen.* Backed points of the Châtelperron type. Hornstone. (1/1).
Fig. 44. *Jernbanestasjonen.* Piercer on pointed flake. (1/1).
Fig. 45a–e. *Jernbanestasjonen.* Flakes from burin blows. (1/1).
Fig. 46. *Jernbanestasjonen.* Double burin on solid flake. At the top and right of figure b is a multi-faceted corner burin which appears to have been sharpened; at the bottom, a simple burin. (1/1).

Plate XVII. *(17)* see the original French pages
Fig. 47. *Jernbanestasjonen.* Massive flake retouched with a corner burin (at the top of the figure) and with a core-form scraper (at the bottom of the figure a). (1/1).
Fig. 48. *Jernbanestasjonen.* Corner burin on a flake with retouched truncation. (1/1).
Fig. 49. *Jernbanestasjonen.* Corner burin on blade with retouched truncation. (1/1).

Fig. 50. *Jernbanestasjonen.* Corner burin on a blade with obliquely retouched truncation. (1/1).
Fig. 51. *Messen.* Thick plate of diabase, roughly retouched so as to form a sort of thick scraper. (1/2).

Plate XVIII. *(18)* see the original French pages
Fig. 52. *Prestegdrden I.* Flake of quartz, triangular in section, whose lower face (burst plane) is roughly recut into a scraper (visible in the figure on the right). On the opposite side, a check mark. (4/5).
Fig. 53. *Prestegården II.* Double tranchet, of hornstone, obtained on a flake by the same process as for the blades of the figs. 3−4 of plate VII−VIII. (1/1).
Fig. 54. *Seilmerket I.* Thick multiple scraper, of hornstone. (1/1).
Fig. 55. *Seilmerket I.* Small diamond biface of medium thickness. Hornstone. (1/1).
Fig. 56. *Seilmerket I.* Slab of gneiss roughly recut on one edge with a blunt tool. (4/5).
Fig. 57. *Seilmerket I.* Plate of diabase, recut into a very heavy scraper. (3/4).
Fig. 58. *Seilmerket I.* Burin. Hornstone. (1/1)

Plate XIX. *(19)* see the original French pages
Fig. 59. *Seilmerket II.* Block of diabase used as core. (4/5).
Fig. 60. *Seilmerket II.* Large core-shaped block, of quartz, used, remade into a very heavy scraper (top). (1/2).
Fig. 61. *Seilmerket II.* Disk of diabase, used. (3/4)

Plate XX. *(20)* see the original French pages
Fig. 62. *Seilmerket II.* Small globose core with beak. Hornstone. (1/1).
Fig. 63. *Seilmerket II.* Discoid tool, of quartz, with biface cut ("Jet stone"). (1/1).
Fig. 64. *Seilmerket II.* Small sub-rectangular core, used. Hornstone. (1/1).
Fig. 65. *Seilmerket II.* Small recut core with well cleared beak at the base (strike surface), visible in the central figure. Hornstone. (1/1).
Fig. 66. *Seilmerket II.* Small discoid biface. Hornstone. (1/1).

Plate XXI. *(21)* see the original French pages
Fig. 67. *Seilmerket II.* Massive plate of quartzite locally formed into a convex and concave scraper. (3/5).
Fig. 68. *Seilmerket II.* Flake of hornstone, retouched as a scraper, in two places on the lower face (to the left of figure b, and, more roughly, at the top of the same figure). The flakes on the upper face (at the top of figure a) are flakes from sharpening the scraper. (1/1).
Fig. 69. *Seilmerket II.* Muzzle scraper on flake, retouched as burin on the affixed side (at the bottom of the figure). Hornstone. (1/1).
Fig. 70. *Seilmerket IL* Burin scraper. Hornstone. (1/1).
Fig. 71. *Seilmerket II.* Large blade retouched and chipped by usage. Hornstone. (4/5).
Fig. 72. *Seilmerket II.* Blade with curved back, Châtelperron type. Hornstone. (1/1).
Fig. 73. *Seilmerket II.* Blade with oblique truncation (forming a concave scraper). Hornstone. (1/1).
Fig. 74. *Seilmerket II.* Flake of hornstone, including the striking plane was converted into a scraper, with lateral notches.. (1/1).

Plate XXII. *(22)* see the original French pages
Fig. 75. *Seilmerket II.* Blade with emerging denticulation, base retouched into a double concave scraper. Hornstone. (1/1).
Fig. 76. *Seilmerket II.* Wide blade with a beak obtained by alternating removals of both sides. Quartz. (1/1).
Fig. 77. *Seilmerket II.* Thick blade with bilateral retouches forming a groove. Hornstone. (1/1).
Fig. 78. *Seilmerket II.* Flake of diabase, sharpened by crude removals. (3/5).
Fig. 79. *Seilmerket II.* Thick plate of quartz, roughly recut into a sort of scraper (right). (4/5).

Plate XXIII. *(23)* see the original French pages
Fig. 80. *Seilmerket II.* Thick flake, of quartz, recut on both edges in the shape of a coarse double scraper. (4/5).
Fig. 81. *Seilmerket II.* Flake of quartzite, with long retouches on the right edge. A notch at the end could be used to facilitate fitting (saw notch). (1/1).
Fig. 82. *Seilmerket II.* Tranchet of hornstone, with fine retouching on the concave edge (to the left front in the figure). (1/1).
Fig. 83. *Seilmerket II.* Scraper-cutter (tranchet). Hornstone. (1/1).

Plate XXIV. *(24)* see the original French pages
Fig. 84. *Seilmerket II.* Ovoid flake of hornstone with a sharp semicircular edge, chipped by use. At the heel, alternate concave cutter. (1/1).
Fig. 85. *Seilmerket II.* Flake of hornstone with one sharp edge, chipped from use, and the other edge recut on both sides. Strike surface retouched using a scraper, with sharpening of the lower face (left of figure b). (1/1).
Fig. 86. *Seilmerket II.* Short blade whose splitting plane has been recut for undetermined use. Quartzite. (1/1).

Plate XXV. *(25)* see the original French pages
Fig. 87. *Seilmerket II.* Mousterian-type point, well retouched on the left. Quartzite. (1/1).
Fig. 88. *Seilmerket II.* Flake retouched towards the top on the lower side. Hornstone. (1/1).
Fig. 89. *Seilmerket II.* Triangular flake, modified on both edges. Quartzite. (4/5).
Fig. 90. *Seilmerket II.* Large flake-point with tang obtained by fractures and thinned by longitudinal removals. Quartzite. (4/5).

Plate XXVI. *(26)* see the original French pages
Fig. 91. *Seilmerket II.* Point with a tang better formed than in the previous piece (fig. 90). Hornstone. (1/1).
Fig. 92. *Seilmerket II.* Flake-point with curved back. Hornstone. (1/1).
Fig. 93. *Seilmerket II.* Burin on core. Hornstone. (1/1).
Fig. 94. *Seilmerket II.* Flute-mouthpiece burin. Hornstone. (1/1).
Fig. 95. *Seilmerket II.* Flute-mouthpiece burin. Hornstone. (1/1).
Fig. 96. *Seilmerket II.* Straight burin on flake. Hornstone. (1/1).
Fig. 97. *Seilmerket II.* Burin corner, obtained on one side by one removal, the other by retouching. Hornstone. (1/1).
Fig. 98. *Seilmerket II.* Double corner burin, on broken blade. Hornstone. (1/1).

Plate XXVII. *(27)* see the original French pages
Fig. 99. *Seilmerket II.* Burin on flake. Hornstone. (1/1)
Fig. 100. *Seilmerket II.* Burin on flake. Hornstone. (1/1).
Fig. 101. *Seilmerket II.* Double burin on corners. Hornstone. (1/1)
Fig. 102. *Seilmerket II.* Double burin on retouched end. Hornstone. (1/1)
Fig. 103. *Seilmerket II.* Angle burin on a small blade with retouched end. Hornstone. (1/1)
Fig. 104. *Seilmerket II.* Angle burin on a small blade with retouched end. Hornstone. (1/1)
Fig. 105. *Seilmerket II.* Triple burin. Hornstone. (1/1)
Fig. 106. *Seilmerket II.* Burin on the corner of a flake. Hornstone. (1/1).

Plate XXVIII. *(28)* see the original French pages
Fig. 107. *Seilmerket II.* Burin on truncated blade, imitating plane burins. Hornstone. (1/1).
Fig. 108. *Seilmerket II.* Flake shaped like a transverse burin (polyhedral) at the top, and like a cutter at the base (thinned). Hornstone. (1/1).
Fig. 109. *Seilmerket II.* Flake fitted with a burin at the top and a scraper in two different places (bottom and left of figure a, top and right of figure b). Hornstone. (1/1).
Fig. 110. *Langøyra.* Block of diabase used as a core, and perhaps recut into a thick scraper. (1/1).
Fig. 111. *Langøyra.* Block of diabase used as a biface-cut core on one edge (chopper?). (1/1).

Plate XXIX. *(29)* see the original French pages
Fig. 112. *Langøyra.* Large block of diabase, used as a core with a partially retouched striking surface. (1/2).
Fig. 113. *Langøyra.* Small core-formed piece with sharp scale edges. Hornstone. (1/1).
Fig. 114. *Langøyra.* Core of quartz with traces of knapping, perhaps recut into a blunt tool. (3/5).
Fig. 115. *Langøyra.* Cordiform plate of porphyry. Thick, smooth heel, point roughly sharpened and crushed by use. (2/3).

Plate XXX. *(30)* see the original French pages
Fig. 116. *Langøyra.* Triangular flake of quartzite with toothed edges, retouched striking surface with removal of the bulb. (4/5).
Fig. 117. *Langøyra.* Thin flake of diabase, retouched on an edge and on the tip (scraper-scraper). (1/1).
Fig. 118. *Langøyra.* Circular flake of diabase, recut as heavy scraper. (4/5).
Fig. 119−120. *Langøyra.* Toothed blades of black quartzite. (1/1).

Fig. 121. *Eidet.* Flake cut on both sides (scraper?). Hornstone. (1/1).

Plate XXXI. *(31)* see the original French pages
Fig. 122. *Nesseby I.* Core of black flint. (1/1).
Fig. 123. *Nesseby I.* Cobble of red quartzite cut on one edge to form a very heavy scraper. (3/5).
Fig. 124. *Nesseby I.* Blade of hornstone, with dorsal retouches towards the tip. (1/1).
Fig. 125. Nesseby I. Large flake of gray quartzite with marks and traces of modification on the lower surface (bottom), with removal of the bulb; the tip sharpened by fine removals. (4/5).
Fig. 126. *Nesseby I.* Thick flake with notch and modification of the opposite edge. Removal of the bulb (top of figure b). Quartzite. (4/5).
Fig. 127. *Nesseby I.* Corner burin. Hornstone. (1/1).
Fig. 128. Nesseby I. End scraper with side cutter (right of figure a). Quartzite. (1/1).

Plate XXXII. *(32)* see the original French pages
Fig. 129. *Nesseby I.* Triangular flake retouched on both sides with removal of the bulb. On the lower face (figure a) there is fine retouching on the right side, at the bottom and to the left, three large facets forming a sort of scraper, and on the left a lateral burin stroke forming a blacker facet. Quartzite. (4/5)
Fig. 130. *Nesseby I.* Coarse tanged flake; but thinned on the upper face by removals as in figures 90−91. Quartzite. (1/1).
Fig. 131. *Nesseby I.* "Tranchet" of hornstone. (1/1).
Fig. 132. *Nesseby II*. Broken blade with blunted back with retouching of the bulb. Quartzite. (1/1).
Fig. 133. *Skitnelv I.* Blade with lateral retouch forming a back on the lower face. Quartzite. (1/1).
Fig. 134. *Skitnelv I.* Fragment of blade with blunt back. Quartzite. (1/1).
Fig. 135. *Skitnelv I.* Blade of hornstone retouched at the base on the lower face. (1/1).

Plate XXXIII. *(33)* see the original French pages
Fig. 136. *Skitnelv I.* Point of quartzite, retouched on both sides. (1/1).
Fig. 137. *Skitnelv I*. Flake of quartzite, scraper retouch on the striking surface (bottom) and at the top. (1/1).
Fig. 138. *Reverelv.* Cobble of quartz, blunt tool scraper, a type of biface. (4/5).
Fig. 139. *Reverelv.* Small round scraper. Quartzite. (1/1).
Fig. 140. *Reverelv*. Small double burin. Quartzite. (1/1).
Fig. 141. *Thomaselv II*. Notched flake, retouched as a scraper at its upper end (fig. b), on the right and left on the lower face (fig. a). (4/5).
Fig. 142. *Stykket*. Cobble of quartzite, used as a striker. (1/1).
Fig. 143. *Stykket.* Short blade with blunted back, broken at the top. Quartzite. (1/1).
Fig. 144. Stykket. Choked blade of quartzite. (1/1).

Plate XXXIV. *(34)* see the original French pages
Fig. 145. *Stykket.* Flake of quartzite, scraper retouch on the lower part with a beak on the opposite side. To the left of figure b there is a slightly concave cutter. (1/1).
Fig. 146. *Stykket.* Cutting tool (at the top) whose wide heel (at the bottom) is finely retouched. Quartzite. (4/5).
Fig. 147. *Stykket.* Piece of quartzite whose heel has been retouched into a scraper, and one of the edges (on the left) into a scraper. (1/1).
Fig. 148. *Stykket.* Coarse point of quartzite. (4/5).
Fig. 149. Stykket. Scraper of quartzite, perhaps with a burin at the base. (1/1).
Fig. 150. *Stykket.* Double burin (?) of quartzite with lateral notch (on the left). (4/5).

Plate XXXV. *(35)* see the original French pages
Fig. 151. *Skytterhuset.* Flake of quartzite forming a scraper on the right and left, one on the upper side and the other on the lower side. (1/1).
Fig. 152. *Skytterhuset*. Thick flake, very worn, with two rough notches, coarsely retouched with a thick scraper at its upper end. Quartzite. (4/5).
Fig. 153. *Skytterhuset*. Thin flake of quartzite, scraper retouch at the base, with corresponding modification of the lower surface and removal of the bulb (bottom of figure b). On the left (fig. a) cutter between two notches. (4/5).
Fig. 154. *Melkevarden I.* Cobble of quartzite used as a striker. (2/3).
Fig. 155. *Melkevarden I.* Small core at the extreme limit of its use. Black flint. (1/1).
Fig. 156. *Melkevarden I.* Core-shaped piece retouched with a scraper (at the bottom of figure b). At the top (fig. a) a beak between two notches. Quartzite. (1/1).

Fig. 157. *Melkevarden I.* Piece of cobble roughly cut into a blunt tool. Quartzite. (3/5).

Plate XXXVI. *(36)* see the original French pages
Fig. 158. *Melkevarden I.* Piece of cobble roughly cut into a coarse point. Quartzite. (1/1).
Fig. 159. *Melkevarden I.* Small burin piercer, of quartzite. (1/1).
Fig. 160. *Melkevarden I.* Flake of quartzite cut into an atypical axe. (1/1).
Fig. 161. *Melkevarden I.* Pointed tool. Quartzite. (1/1).
Fig. 162. *Melkevarden I.* Double coarse scraper. Quartzite. (1/1).

Plate XXXVII. *(37)* see the original French pages
Fig. 163. *Melkevarden I.* Massive flake of quartzite, cut as a very heavy scraper. (2/3).
Fig. 164. *Melkevarden I.* Thin flake with facets (left) and with a burin beak (top). Quartzite. (4/5).
Fig. 165. *Melkevarden I.* Thick flake with two removals (top) forming a burin. Quartzite. (1/1).
Fig. 166. *Melkevarden I.* Burin from a blade of black flint. (1/1).
Fig. 167. *Melkevarden III.* Small cordiform point of quartzite. (1/1).
Fig. 168. *Sletta.* Quadrangular flake with terminal retouches enhanced at the base by reverse removals. Red quartzite. (4/5).

Plate XXXVIII. *(38)* see the original French pages
Fig. 169. *Sletta.* Large and coarse burin. (4/5).
Fig. 170. *Olahaugen.* Flake of red quartzite recut on the chopper edges with removal of the bulb (bottom and right of figure a). (3/4).
Fig. 171. *Olahaugen.* Discoid core of red quartzite, at the end of its use. Following the cutting of short blades, with alternating blows on the edges, the piece took the shape of a circular biface. (1/1).

Plate XXXIX. *(39)* see the original French pages
Fig. 172. *Molvika.* Core of quartzite reused as a scraper. (9/10).
Fig. 173. *Molvika*. Scraper on tip of a blade. Flint. (9/10).
Fig. 174. *Molvika*. Triangular flake of quartzite, recut on the right edge and towards the tip. (9/10).
Fig. 175. *Molvika*. Thick flake of quartzite, ending with a large beak, between two notches. There are also side notches and a scraper at the base. (9/10).
Fig. 176. *Molvika*. Burin on the side of a core, of flint. (9/10).
Fig. 177. *Smellroren*. Discoid core, in red quartzite, recut to be used for scraping. (1/1).

Plate XL. *(40)* see the original French pages
Fig. 178. *Smellroren*. Discoid core, of red quartzite, recut to be used for scraping. (1/1).
Fig. 179. *Smellroren*. Discoid core, of red quartzite, recut to form a beak. The edge opposite this (bottom) has been made sharp by retouching on one side and by removal on the other. (1/1).
Fig. 180. *Smellroren*. Discoid core, of red quartzite, with a beak resembling a thick scraper. (1/1).

Plate XLI. *(41)* see the original French pages
Fig. 181. *Smellroren*. Thick discoid core, of red quartzite, the edge of which (visible from the front in figure a) has been shaped into a chopper. (1/1).
Fig. 182. *Smellroren*. Discoid core, of red quartzite, showing (figure b) a main flake removed from a prepared striking surface (not visible in the figure) and three short blades detached on the previously peeled perimeter (peeling clearly visible to the left of the figure a). (2/3).

Plate XLII. *(42)* see the original French pages
Fig. 183. *Smellroren*. Discoid block clipped on both sides in the shape of a sort of punch. Red quartzite. (2/3).
Fig. 184. *Smellroren*. Two-sided tool, of red quartzite, with sharpened tip. (2/3).

Plate XLIII. *(43)* see the original French pages
Fig. 185. *Smellroren*. Incomplete bifacial tool whose tip was broken while being worked. Red quartzite. (2/3).
Fig. 186. *Smellroren*. Biface with terminal cutter, made from a flat cobble, with parts of the surface still present. Red quartzite. (2/3).

Plate XLIV. *(44)* see the original French pages

Fig. 187. *Smellroren*. Unfinished biface cut from a cobble. Red quartzite. (2/3).
Fig. 188. *Smellroren*. Elongated flake, of red quartzite, cut from a cobble whose original surface is partially visible (fig. a). At the top of figure b, we see the oblique and unretouched striking plane with a large bulb of percussion. (1/2).

Plate XLV. *(45)* see the original French pages
Fig. 189. *Smellroren*. Ovoid flake of red quartzite. On the upper side we see the hollow imprint of a large splinter removed by a blow given to the striking surface (top). (1/2).
Fig. 190. *Smellroren*. Thick flake, vivid at the top. Red quartzite. (1/2).
Fig. 191. *Smellroren*. Large flake with recut striking surface, with removal of the bulb, notches and marginal retouches. Chips around the tip. Red quartzite. (3/5).
Fig. 192. *Smellroren*. Flake of the same type, with a thicker base. Removal of the bulb (bottom and left of fig. a). Red quartzite. (3/4).

Plate XLVI. *(46)* see the original French pages
Fig. 193. *Smellroren*. Thin flake locally recut on the lower side. Red quartzite. (4/5).
Fig. 194. *Smellroren*. Thin flake flake recut on the lower face with the formation of three notches. Red quartzite. (4/5).
Fig. 195. *Smellroren*. Elongated flake whose bulb has been cut by retouching. The removals that we see on the upper face (at the top of figure b) are probably sharpening retouches. Red quartzite. (4/5).

Plate XLVII. *(47)* see the original French pages
Fig. 196. *Smellroren*. Flake of the same character as the previous one (fig. 195 of plate XLVI). Red quartzite. (3/5).
Figs. 197−198. *Smellroren*. Thick flakes retouched (at the top of the figure) with thick scrapers. Fig. 197 side view. Red quartzite. (4/5).
Fig. 199. *Smellroren*. Thick flake created by long retouches on the tip and on the lateral edges. Red quartzite. (2/3).

Plate XLVIII. *(48)* see the original French pages
Fig. 200. *Smellroren*. Thick discoid flake shaped into a heavy scraper on the upper side (bottom and right of figure b) and on the lower side (top and left of figure a). Red quartzite. (3/5).
Fig. 201. *Smellroren*. Flake of red quartzite recut as double scraper. The edge seen from the front forms a thick scraper which has been sharpened by removals on the lower face. Below and to the right there is another scraper made by extensive retouching of the lower face. (4/5).
Fig. 202. *Smellroren*. Flake retouched as a scraper on the tip and on the right edge (bottom). Red quartzite. (1/1).
Fig. 203. *Smellroren*. Lateral scrapers, convex and concave, on a thick flake. Red quartzite. (1/1).
Fig. 204. *Smellroren*. Double scraper on a flake. Red quartzite. (1/1).

Plate XLIX. *(49)* see the original French pages
Fig. 205. *Smellroren*. Massive flake with diamond-shaped section, laterally formed into scrapers, and whose edge (front view in figure a) has been blunted at one of the ends (top) to form a sort of scraper or burin-cutter. Red quartzite. (4/5).
Fig. 206. *Smellroren*. Thin flake whose edges have been recut by alternate flakes (two-sided scraper). Red quartzite. (4/5).
Fig. 207. *Smellroren*. Tool of the same order, less regular. Red quartzite. (4/5).
Fig. 208. *Smellroren*. Double scraper truncated at the base and at the top by a sort of coup-de-burin. Red quartzite. (3/4).

Plate L. *(50)* see the original French pages
Fig. 209. *Smellroren*. Large flake with a sharp edge, forming a notch on one of the edges and forming a scraper at both ends. At the top and to the right of figure b we see a removal by a sort of burin blow. Red quartzite. (4/5).
Fig. 210. *Smellroren*. Flake forming a scraper (to the right of figure b) and burin (at the top of the same figure). Red quartzite. (3/5).
Fig. 211. *Smellroren*. Flake with a thick heel, forming a trench at the top. On either side are various thick scrapers. Red quartzite. (4/5).

Plate LI. *(51)* see the original French pages
Fig. 212. *Smellroren*. Flake highlights in a sort of peak. The base looks like a damaged tranchet. Red quartzite. (2/3).
Fig. 213. *Smellroren*. Red quartzite cleaver. (2/3).
Fig. 214. *Smellroren*. Similar tool. Red quartzite. (1/2).

Plate LII. *(52)* see the original French pages
Fig. 215. *Smellroren*. Flake shaped like an ax with two edges. The upper edge is finely retouched. Red quartzite. (3/5).
Fig. 216. *Smellroren*. Axe on flake (tranchet). Red quartzite. (2/3).
Fig. 217. *Smellroren*. Tranchet of red quartzite. (4/5).

Plate LIII. *(53)* see the original French pages
Fig. 218. *Smellroren*. Flake with straight edges, ending at the top and bottom with sharp parts ("double tranchet" of the type in figures 3−4 of Pl. VII−VIII, e.t.c). Red quartzite. (4/5).
Fig. 219. *Smellroren*. Coarse blade curved by retouching and forming a knife on the side opposite this back. The base may be suitable for fitting. Red quartzite. (2/3)
Fig. 220−221. *Smellroren*. Elongated flake with curved backs due to retouching and chipped cutting edges. Red quartzite. (1/1).

Plate LIV. *(54)* see the original French pages
Fig. 222. *Smellroren*. Elongated flake with curved back by retouching and chipped cutting edge. Red quartzite. (1/1).
Fig. 223. *Smellroren*. Mousterian-type tip retouched towards the top and with a thinned base. Red quartzite. (1/1).
Fig. 224. *Smellroren*. Large retouched point on one of the edges, towards the top. The base was made by retouching using a thick scraper, the lower face of which is formed by the left side of the upper face of the piece. Red quartzite. (4/5).

Plate LV. *(55)* see the original French pages
Fig. 225. *Smellroren*. Elongated flake with a thinned base, with fine touch-ups towards the tip. Gray quartzite. (1/1).
Fig. 226. *Smellroren*. Pointed flake with removal of the bulb and other modification modifications. Red quartzite. (1/1).
Figs. 227−228. *Smellroren*. Beautiful Mousterian-type points with lateral notches on one of them. (Fig. 228). Red quartzite. (227: 4/5, 228: 1/1)
Figs. 229−230. *Smellroren*. Small spikes with more or less steep backs like the spikes of Abri-Audi. Red quartzite and hornstone. (9/10).

Plate LVI. *(56)* see the original French pages
Figs. 231−235. *Smellroren*. Small pointed backs more or less steep, often like the points of Abri-Audi. Red quartzite. (1/1).
Fig. 236. *Smellroren*. Thick blade with triangular section, finely retouched at the tip and thinned at the base. Red quartzite. (3/5).
Fig. 237. *Smellroren*. Point of the same type, thinned at the base by retouches of another kind, well retouched on one edge towards the point. Red quartzite. (4/5).
Fig. 238. *Smellroren*. Punch on the end of the blade. Red quartzite. (1/1).

Plate LVII. *(57)* see the original French pages
Fig. 239. *Smellroren*. Punch on the end of the blade, released by a tick on the left. Red quartzite. (1/1).
Figs. 240−246. *Smellroren*. Blades with lateral retouches sometimes forming a back. Some have checkmarks. Red quartzite, except fig. 242 which is gray quartzite. (240−242: 4/5, 243−246: 1/1).

Plate LVIII. *(58)* see the original French pages
Figs. 247−250. *Smellroren*. Beautiful blades with a curved back plus a curved moire. Red quartzite. (1/1).
Figs. 251−255. *Smellroren*. Blades or slats with curved backs of the general Châtelperron type. Fig. 251 and 255: red quartzite, fig. 252 to 254: Hornstone and flint. (1/1).

Plate LIX. *(59)* see the original French pages

Figs. 256−257. *Smellroren*. Convex and concave scrapers on the end of the blade. Red quartzite. (1/1).
Fig. 258. *Smellroren*. Double lateral burin on oblique natural fracture. Red quartzite. (1/1).
Fig. 259. *Smellroren*. Double polyhedral burin at the top of the flake. Red quartzite. (3/4).
Figs. 260−261. *Smellroren*. Burin of the type of busque burins. Red quartzite. (4/5).
Fig. 262. *Smellroren*. Multi-faceted burin on oblique fracture. Red quartzite. (1/1).

Plate LX. *(60)* see the original French pages
Fig. 263. *Smellroren*. Two-sided flake with burin beak (at the top) and scraper cut at the bottom and right (figure b). Red quartzite. (4/5).
Fig. 264. *Smellroren*. Core reused as a transverse burin. Red quartzite. (4/5).
Figs. 265−267. *Smellroren*. Microlithic terminal burins. Flint. (1/1).
Fig. 268. *Smellroren*. Piece with sharp terminal edges (top and bottom)
Figs. 269−271. Smellroren. Small points with curved backs. Flint. (1/1).
Fig. 272. *Smellroren*. Small tanged point of red quartzite. (1/1).

Plate LXI. *(61)* see the original French pages
Fig. 273. *Hamnesodden*. Red quartzite flake, very worn, with a beak at the top, and a scraper on the opposite edge. (1/1).
Fig. 274. *Hansemolla*. Discoid core reused as a scraper. Gray quartzite. (4/5).
Fig. 275. *Hansemolla*. Discoid core at the beginning of its use. Red quartzite. (1/2).

Plate LXII. *(62)* see the original French pages
Fig. 276. *Hansemolla*. Two-sided tool. Red quartzite. (2/3).
Fig. 277. *Hansemolla*. Mousterian-type flake in red quartzite, with two ticks (to the right and left of figure a). At the top we see a well-retouched part (on the left) and a cutting edge (right). (4/5).
Fig. 278. *Hansemolla*. Tranchet of red quartzite with scraper on one edge (to the right of figure a). (4/5).

Plate LXIII. *(63)* see the original French pages
Fig. 279. *Hansemolla*. Red quartzite scraper (left of figure). (4/5).
Fig. 280. *Hansemolla*. Triangular quartzite plaque with marginal retouching. (4/5).
Fig. 281. *Hansemolla*. Small point with dorsal touch-ups. Quartzite. (1/1).
Fig. 282. *Hansemolla*. Large flake with a burin beak, between lateral removals visible on both figured faces. Quartzite. (3/5).

Plate LXIV. *(64)* see the original French pages
Fig. 283. *Hansemolla*. Rolled piece with scraper at the top, lateral notch on the right (fig. b) and large coarse burin at the bottom. Quartzite. (1/1).
Fig. 284. *Katuglelva*. Core scraper of hornstone resembling keel scrapers. (Ill).
Figs. 285−286. *Katuglelva*. Thick blades retouched on the right and left. Quartzite and flint. (l/l).
Fig. 287. *Ekebergvika*. Core reused as a scraper. Quartzite. (4/5).

Plate LXV. *(65)* see the original French pages
Fig. 288. *Ekebergvika*. Large flake with sharp edge at the base, by removal of the bulb and bifacial removals. Quartzite. (1/2).
Fig. 289. *Ekebergvika*. Flake retouched with a scraper. Worn. Quartzite. (4/5).
Fig. 290. *Ekebergvika*. Flake of quartzite forming a scraper at the top and a cutter at the base. (4/5).
Fig. 291. *Ekebergvika*. Flake of quartzite with retouching of the edges and the lower face (fig. a). (Concave and convex scraper). (4/5).

Plate LXVI. *(66)* see the original French pages
Fig. 292. *Ekebergvika*. Flake of quartzite with complete retouching of the upper face and partial retouching of the lower face. (Scraper). (4/5).
Fig. 293. *Ekebergvika*. Coarse scraper. Quartzite. (3/5).
Fig. 294. *Ekebergvika*. Coarse scraper. Quartzite. (4/5).
Fig. 295. *Ekebergvika*. Sub-triangular flake, slightly retouched at the tip. Quartzite. (4/5).

Plate LXVII. *(67)* see the original French pages
Fig. 296. *Ekebergvika*. Double tranchet on blade fragment truncated as fig. 3−4 etc. Quartzite. (4/5).

Fig. 297. *Ekebergvika*. Triangular flake rolled, slightly recut into blunt tool. Quartzite. (4/5).
Fig. 298. *Storelva*. Small tranchet of red quartzite. (1/1).

Plate LXVIII. *(68)* see the original French pages
Fig. 299. *Storelva*. Double racloir with terminal cutter (false tranehet). Red quartzite. (4/5).
Fig. 300. *Storelva*. Flake of red quartzite with burin point (top). The right edge is briefly retouched with a scraper. (4/5).
Fig. 301. *Storelva*. Block of red quartzite with burin beak (top and left of the figure), obtained by crude retouching and removal by "burin blow". The straight edge forms an irregular edge, slightly retouched. (1/1).
Fig. 302. *Berlevåg*. Cobble of red quartzite used as core and recut as a chopper. (1/2).

Plate LXIX. *(69)* see the original French pages
Fig. 303. *Berlevåg*. Flake of red quartzite retouched with a burin at the top, and perhaps with a scraper and burin at the base. (1/1).
Fig. 304. *Berlevåg*. Flake of red quartzite made into a burin at the top, one of the edges forming a sort of tranchet (on the right of the figure). (2/3).
Fig. 305. *Berlevåg*. Blade with blunt back. Possibly used secondarily as a burin (bottom and right). Hornstone. (1/1).
Fig. 306. Zoar. Tranchet of red quartzite. (1/1).
Fig. 307. *Zoar*. Flake of red quartzite whose straight edge forms a scraper. (1/1).

Plate LXX. *(70)* see the original French pages
Fig. 308. *Zoar*. Toothed flake of red quartzite. (1/1).
Fig. 309. *Zoar*. Triangular flake of red quartzite, retouched to a heavy scraper on the edges, towards the top. At the bottom, a sort of narrow burin formed by two removals of the lower face (fig. b) and by a corresponding modification of the upper face (fig. a). (4/5).
Fig. 310. *Zoar*. Thick flake of red quartzite, roughly retouched to a terminal scraper on the upper face, with corresponding modification of the lower face. On this same face we see a notch obtained by a single removal (on the right), and a sort of burin (on the left and below). (1/1).

Plate LXXI. *(71)* see the original French pages
Fig. 311. *Brattbakken*. Atypical tranchet of which one of the edges is retouched with a scraper. Red quartzite. (1/1).
Fig. 312. *Brattbakken*. Atypical tranchet, retouched with a scraper on the edges, and the percussion bulb has been preserved (bottom and left of fig. a). (1/1).
Fig. 313. *Skjånes*. Mousterian-type flake point, slightly retouched on the edges. Quartzite. (4/5).
Fig. 314. *Skjånes*. Flake of quartzite, retouch as a scraper on one edge (to the right of figure a). The opposite edge is shaped into a burin (?) by a removal on the lower face (figure b). (4/5).

Plate LXXII. *(72)* see the original French pages
Fig. 315. *Skjånes*. Thick flake of gray quartzite, sharp at the top like a punch. The heel at the bottom is recut like a very heavy scraper with removal of the bulb.(4/5).
Fig. 316. *Skjånes*. Elongated flake in gray quartzite, retouched as convex and concave scraper. (3/5).
Fig. 317. *Skjånes*. Straight burin of gray quartzite. (3/5).
Fig. 318. *Skarsvåg*. Flake of quartzite, concave scraper retouched on one edge (left of figure a). At the top and to the left of figure b we see a coarse burin of the "plane burin" type. (4/5).

Plate LXXIII. *(73)* see the original French pages
Fig. 319. *Valan*. Large block, gray quartzite, with surface signs of the rolled surface of the cobble, showing the style of knapping. First flakes were removed (at among others numbers 1, 2 and 3 in figure b) by blows given to the surface of the cobble. Then the orientation of the block was changed, and by striking blows on the surface prepared by the first removals, flakes were detached at numbers 4 and 5 (seen in their original place in figure b, and by their lower face in fig. c). The block was turned again, and the flakes at number 7 and 8 (figure b) were chipped by blows on the striking surface produced by the removal of the flakes numbers 3, 4, and 5. Finally, the block was turned one last time and a flake number at 6 (figures a and b) was obtained by a blow on the silver imprint left by flake number 7. The sinuous edge resulting from this alternate knapping is shown in Fig. d. (Approx. 2/5).

Plate LXXIV. *(74)* see the original French pages

Fig. 320. *Valan*. Thick rolled plate, in gray quartzite, recut on the edges. We see at the top a sort of gigantic snout exposed by two notches. The base has been adjusted. (2/5).
Fig. 321. *Valan*. Pebble, in dark gray quartzite, rolled, recut into a sort of crude punch. (1/2).

Plate LXXV. *(75)* see the original French pages
Fig. 322. *Valan*. Punch made from a diabase cobble. Rolled. (4/5).
Fig. 323. *Valan*. Thick plate, made of diabase, pointed at the top as if to serve as a blunt tool, now worn out. The base was recut like a huge thick scraper. (2/3).

Plate LXXVI. *(76)* see the original French pages
Fig. 324. *Valan*. Elongated flake, made of quartzite, crushed at the end following its use as a blunt tool. Rolled. (2/5).
Fig. 325. *Valan*. Triangular flake, of quartzite, roughly scraped on one edge (to the right of figure a) with slight removals on the opposite side (to the left of figure b). (3/5).

Plate LXXVII. *(77)* see the original French pages
Fig. 326. *Valan*. Elongated flake, of quartzite, truncated by fracture, the two edges forming sharp edges (a sort of false "double tranchet" as in figures 3−4 etc.). (4/5).
Fig. 327 *Valan*. Very hard, heavily rolled quartzite plate. One edge has been retouched into a rough scraper (to the right of figure b). (41/5).
Fig. 328. *Lafjordstua*. Discoid core of white quartzite with beak on the edge. (1/1).
Fig. 329. *Lafjordstua*. Discoid core very thin, cobble-shaped, at the end of its use, faceted and scale on one edge (to the right of figure a and to the left of figure b). At the top a natural cutting edge. Black quartzite. (1/1).
Fig. 330. *Lafjordstua*. Hornstone blade with retouching on the lower face. (1/1).
Fig. 331. *Lafjordstua*. Point, of quartz, with tang obtained by reverse retouching of the two edges. (1/1).

Plate LXXVIII. *(78)* see the original French pages
Fig. 332. *Repvågeidet*. Scraper-cut quartzite flake at the top and left of figure b, with correlative modification of the lower face (at the top of figure a) and removal of the bulb. (4/5).
Fig. 333. *Vedbotneidet*. Quartzite cobble used as a core. Cutting in two different directions. (1/1).
Fig. 334. *Vedbotneidet*. Quartzite cobble used as core with three prepared striking planes. (1/).
Fig. 335. *Vedbotneidet*. Discoid core, of quartzite, from which a large flake has been removed. (1/1).

Plate LXXIX. *(79)* see the original French pages
Fig. 336. *Vedbotneidet*. Small flint core with an oblique and retouched striking surface, perhaps reused as a scraper. (1/1).
Fig. 337. *Vedbotneidet*. Sub-rectangular quartzite block. Sinuous sharp edge (seen from the front). The other edge is suitable for gripping. (2/3).
Fig. 338. *Vedbotneidet*. Small tranchet of quartzite. (1/1).
Fig. 339. *Vedbotneidet*. Thick scraper on flake whose lower face is retouched on the left side (fig. b). Quartzite. (4/5).

Plate LXXX. *(80)* see the original French pages
Fig. 340. *Vedbotneidet*. Fragment of quartzite cobble, roughly recut on the edges for refining or cutting. (4/5).
Fig. 341. *Vedbotneidet*. Flake of quartzite retouched as a scraper on the right (fig. a). The base is roughly recut to serve as a scraper(?) (fig. b), with an adjusting removal on the opposite side (fig. a). (4/5).
Fig. 342. *Vedbotneidet.* Triangular Mousterian-type flake with slightly chipped edges. Quartzite. (1/1).

Plate LXXXI. *(81)* see the original French pages
Fig. 343−344. *Vedbotneidet.* Large tanged points derived from massive flakes. The points were broken. Quartzite. (4/5).
Fig. 345. *Vedbotneidet*. Tanged quartzite point. (1/1).
Fig. 346. *Vedbotneidet*. Tanged quartzite point. The broken tip was removed (left) to resemble a burin. (4/5).

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Fig. 347. *Vedbotneidet.* Wide quartzite blade. On the right a sharp, chipped edge. The left edge shows long

retouching on the lower side. (4/5).
Fig. 348. *Russedalen.* Flint core, widely used, whose very oblique and retouched striking plane (at the top of figure a) forms an acute and sharp angle with the knapped surface. (1/1).
Fig. 349. *Russedalen.* Piece of core retouched using a scraper or side scraper. Chips from usage. Flint. (1/1).
Fig. 350. *Russedalen.* Small "plane" burin. Flint. (1/1).
Fig. 351. *Russedalen.* Thick, multi-faceted burin. Flint. (1/1).
Fig. 352. *Russedalen.* Thick flint flake. Removal by "burin blows" at the upper angles. Below, edge sharpened by retouching the lower face (fig. b). (1/1).

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Fig. 353. *Kolvik.* Discoid core of quartzite, in which a large flake has been removed from the upper part (right). (2/3).
Fig. 354. *Kolvik.* Discoid tool on flake, recuts on the edges like "throwing stones". Quartzite. (4/5).

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Fig. 355. *Kolvik.* Thick plate of quartzite whose end is recut into a very heavy scraper. (3/5).
Fig. 356. *Storbukta.* Sub-discoidal core recut as an axe (bottom) and retouched at the other end as a thick scraper (visible in profile in the drawing). Flint. (1/1).
Fig. 357. *Storbukta.* Pointed cobble whose heel is adapted for gripping. Quartzite. (1/1).
Fig. 358. *Storbukta.* Quartzite block recut on the edges as a cutting tool or a very heavy scraper. (4/5).
Fig. 359. *Storbukta.* Flake of quartzite, retouched as a scraper (at the top of fig. a) and as a burin on the opposite side. (1/1).

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Fig. 360. *Storbukta.* Small, well-retouched scraper. The convex heel is modified by removals from the lower face, on the side opposite the useful part. Flint (1/1).
Fig. 361. *Storbukta.* Retouched flake in convex scrape (left), with two notches on the cutting edge (right). At the top there may be a burin. Quartzite. (4/5).
Fig. 362. *Storbukta.* Sharpening slice of a core retouched into a convex and concave scraper. Quartzite. (1/1).
Fig. 363. *Storbukta.* Quartzite blade with side notch. (1/1).
Fig. 364. *Storbukta.* Thick and wide blade, a sort of scraper-knife. The sharp left edge shows traces of use, the other is crudely retouched. Quartzite. (4/5).
Fig. 365. *Storbukta.* Wide blade whose left edge is brought down towards the tip. Quartzite. (1/1).

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Fig. 366. *Storbukta.* Wide blade whose straight edge is brought down towards the tip. The base is thinned. Quartzite. (1/1).
Fig. 367−371. *Storbukta.* Slats and small flake with retouched or curved backs. Flint (fig. 370: quartz). (1/1).
Fig. 372. *Storbukta.* Large tanged quartzite point. (1/1).
Fig. 373−374. *Storbukta.* Quarter-tanged arrowheads. (1/1).
Fig. 375. *Storbukta.* Simple burin on elongated flake. Quartzite. (4/5).
Fig. 376. *Storbukta.* Burin on fracture angle. Quartzite. (4/5).

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Fig. 377. *Storbukta.* Thick blade with gouge-shaped terminal cuts. Flint. (1/1).
Fig. 378. *Storbukta.* Blade with gouge end and side burin. Flint. (1/1).
Fig. 379. *Børselvneset.* Discoid core cut from a cobble and prepared to provide fragments, but not yet used. Quartzite. (1/2).
Fig. 380. *Børselvneset.* Core cut from a cobble. Blades were detached from oblique faceted striking planes. Quartzite. (1/1).

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Fig. 381. Børselvneset. Cordifrom biface, cut from a cobble. Quartzite. (2/3)
Fig. 382. Børselvneset. Quartzite cobble enhanced by biface cutting. Quartzite. (2/3)
Fig. 383. Børselvneset. Large Levallois-style flake, the edges chipped from use. Retouched checkmarks at the top and on the right edge. Quartzite. (3/4).

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Fig. 384. *Børselvneset.* Large flake with striking surface retouched secondarily with removal of the bulb. Retouches on both edges with retouched notch on the right. Quartzite. (3/4).
Fig. 385. *Børselvneset.* Large pseudo-Clactonian flake, very oblique striking surface, unretouched, and large percussion bulb. Retouches on the left edge and tip. Quartzite. (3/4).
Fig. 386. *Børselvneset.* Rectangular core with very oblique striking surfaces. Both edges are scraped; the two ends appear to be slightly retouched. Quartzite. (3/4).
Fig. 387. *Børselvneset.* Flake recut into a concave and convex scraper with a beak between two notches at the top. Scraper on left edge. Quartzite. (4/5).

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Fig. 388. *Børselvneset.* Scraper on massive flake. Quartzite. (1/1).
Fig. 389. *Børselvneset.* Shard whose edges are designed to scratch and cut by large alternating retouching of the two sides. Quartzite. (1/1).
Fig. 390. *Børselvneset.* Triangular flake of the Mousterian type, roughly retouched on the edges towards the tip. Quartzite. (4/5).
Fig. 391. *Børselvneset.* Elongated triangular flake, roughly tanged. Quartzite. (4/5).

Fig. XCI. *(91)* see the original French pages
Fig. 392. *Børselvneset.* Triangular flake modified for fitting by large removal of the base. Lower face slightly retouched on the right edge. Quartzite. (4/5).
Fig. 393. *Børselvneset.* Retouched backed point, formed from the residue of a core at the end of its use. Flint. (1/1).
Fig. 394. *Børselvneset.* Blade with retouched terminal truncation. Quartzite. (4/5).
Fig. 395. *Børselvneset.* Quartzite blade whose left edge is cut towards the tip, and the right edge slightly retouched and chipped. Quartzite. (1/1).
Fig. 396. *Børselvneset.* Burin derived from a thin, highly exploited core. Flint. (1/1).
Fig. 397. *Børselvneset.* Double burin, thick, with retouched truncation. Flint. ('h).
Fig. 398. *Børselvneset.* Multi-faceted burin. Quartzite. (1/1).

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Fig. 399. *Bossekop I.* Discoid core. Flint. (1/1).
Figs. 400–402. *Bossekop I.* Chipped pieces. Flint. (1/2 and 1/1).
Fig. 403. *Bossekop I.* Core retouched to a thick scraper at both ends. Flint. (1/1).
Fig. 404. *Bossekop I.* Flake of quartzite formed at the summit as a blunt tool. (3/4).
Fig. 405. *Bossekop I.* Fragment of flint roughly cut into a blunt tool (point). (1/1).
Fig. 406. *Bossekop I.* Flint point roughly retouched on one edge. (1/1).

Plate XCIII. *(93)* see the original French pages
Fig. 407. *Bossekop I.* Quartz flake retouched as a scraper, forming burin at the base. (1/1).
Fig. 408. *Bossekop I.* "Double tranchet" of quartz (see figs. 3–4 etc.). (1/1).
Fig. 409. *Bossekop I.* Quartz flake forming a scraper, convex on the upper side and concave on the lower side. (1/1).
Fig. 410. *Bossekop I.* Quartz scraper cut on both sides leaving a beak. (1/1)

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Fig. 411. *Bossekop I.* Flint flake forming a beak (piercer) in the upper part and a scraper in the lower part. (1/1).
Fig. 412. *Bossekop I.* Short blade forming a terminal scraper. The piece is worn and retouched or chipped on the edge. (1/1).
Fig. 413. *Bossekop I.* Flint flake with a finely retouched notch. (1/1).
Fig. 414–416. *Bossekop I.* Flint (fig. 414) and quartz (415, 416) burins. (1/1).
Fig. 417–418. *Bossekop I.* Flakes of flint with dorsal retouches towards the tip. (1/1).
Fig. 419–420. *Bossekop I.* Two tanged arrowheads, quartz and flint. (1/1).

Plate XCV. *(95)* see the original French pages
Fig. 421. *Bossekop II.* Large flint core. (4/5).
Fig. 422. *Bossekop II.* Discoid core of flint. (1/1).
Fig. 423. *Bossekop II.* Thin core of flint, extremely exploited, with beak and alternating retouches of the perimeter on the lower face. (1/1).
Fig. 424. *Bossekop II.* Large flake in recut quartzite towards the tip and on the edges. (1/2).

Fig. 425. *Bossekop II.* Wide blade truncated in the manner of "sinew spawners" (see figures 467−469 of pl. CI), with removal of the bulb (at the bottom of figure b). Flint. (1/1).

Fig. XCVI. *(96)* see the original French pages
Fig. 426. *Bossekop II*. Keel scraper or flint busque burin (see figures 260, 261 etc.). (1/1).
Fig. 427. *Bossekop II.* Corner burin of flint. (1/1).
Fig. 428. *Bossekop II.* Double burin with side point. Flint. (1/1).
Fig. 429−430. *Bossekop II.* Tanged arrowheads. Flint and quartzite. (1/1).
Fig. 431. *Tollevik.* Discoid core. Flint. (1/1).
Fig. 432. *Tollevik.* Elongated core, of flint, with very oblique striking surfaces, one of which is provided with facets and the other obtained by a single removal. (1/1).
Fig. 433. *Tollevik.* Thick flake retouched with a scraper on the edge of a concave truncation without retouch cutting the bulb. Flint. (1/1).

Plate XCVII. *(97)* see the original French pages
Fig. 434. *Tollevik.* Convex and concave scraper on flint flake. (1/1).
Fig. 435. *Tollevik.* Makeshift burin on thick flake. Flint. (1/1).
Fig. 436. *Tollevik.* Straight burin on flint flake. (1/1).
Fig. 437−438. *Tollevik.* Burins on elongated flakes. Flint. (1/1).
Fig. 439. *Tollevik.* Double burin on a narrow core fragment retouched at the end for this purpose. Flint. (1/1).
Fig. 440. *Tollevik.* Flint blade with back turned towards the point which appears to be used as a burin. The edge is finely retouched. (1/1).
Fig. 441. *Tollevik.* Small blade with back turned towards the tip. Flint. (1/1).
Fig. 442−443. *Tollevik.* Small tanged points. Flint. (1/1).
Fig. 444. *Tollevik.* Microlithic corner burin. Flint. (1/1).

Plate XCVIII. *(98)* see the original French pages
Fig. 445. *Steinseng.* Flint plaque with traces of knapping of blades and bladelets. (Approx. 1/2).
Fig. 446−448. *Steinseng.* Discoid core of flint probably used as scrapers. (1/1).
Fig. 449. *Steinseng.* Flint core, much used. (1/1).
Fig. 450. *Steinseng.* Biface diabase tool. (1/1).

Plate XCIX. *(99)* see the original French pages
Fig. 451. *Steinseng.* Two-sided cutting tool with two lateral notches. Flint. (1/1).
Fig. 452. *Steinseng.* Flint core scraper. (1/1).
Fig. 453. *Steinseng.* Base of a wide, broken and rolled blade. Quartzite. (3/5).
Fig. 454. *Steinseng.* Flake with points made by clips on both sides (drill?). Flint. (1/1).
Fig. 455. *Steinseng.* Thick flake with a mark obtained by a single large removal. Retouching modification on the other face (fig. a). (3/4).
Fig. 456. *Steinseng.* Scraper on quartz flake. (1/1).

Plate C. *(100)* see the original French pages
Fig. 457. *Steinseng.* Quartz flake forming a scraper with a beak on the left and a summary checkmark on the right. (1/1).
Fig. 458. *Steinseng.* Small tranchet of the type of fig. 3−4 etc. on a fragment of a truncated blade, by simple breakage on the right and by retouching on the left (fig. a). Quartz. (1/1).
Fig. 459. *Steinseng.* Shard forming three edges (right, bottom and top of fig. a). Quartz. (1/1).
Fig. 460. *Steinseng.* Thick quartz scraper. (1/1).
Fig. 461. *Steinseng.* Scraper of the type of keel scraper. The fairing forms useful notches on the right and left. Quartz. (4/5).
Fig. 462. *Steinseng.* Thick scraper forming a muzzle. Flint. (1/1).
Fig. 463. *Steinseng.* Nucleus used as a scraper at the base and at the top with modifications to the lower surface (fig. b). On this same face, to the right, we see another scraper sharpened by a removal on the opposite face (fig. a). Quartz. (1/1).

Plate CI. *(101)* see the original French pages
Fig. 464. *Steinseng.* Wide scraper sharpened by removal of the lower face (at the top of fig. b). Quartz. (1/1).
Fig. 465. *Steinseng.* Flint bladelet with retouches at the head and on the left edge. (1/1).
Fig. 466. *Steinseng.* Rectilinear scraper on rolled blade tip. Flint. (1/1).

Fig. 467–469. *Steinseng.* Thick blades truncated at one end or both in the manner of the "sinew frayers" of Kenya (see fig. 425). The removals on the upper surface were probably used for sharpening. Flint. (1/1).

Plate CII. *(102)* see the original French pages
Fig. 470. *Steinseng.* Blade retouched at the end and on the right edge with a reserved beak. At the top and to the left, we see a narrow burin. Quartz. (1/1).
Fig. 471. *Steinseng.* Blade with burined beak (on the right and at the top of fig. b), retouched into a lateral scraper (on the right of figure b) and concave (at the top of the same figure). Quartz. (1/1).
Fig. 472. *Steinseng.* Convex flint scraper. (1/1).
Fig. 473. *Steinseng.* Multiple angle burin. Flint. (1/1).
Fig. 474. *Steinseng.* Corner burin. Flint. (1/1).
Fig. 475. *Steinseng.* Burin of the type of busque burin (of the type fig. 260, 261 etc.) Flint. (1/1).

Plate CIII. *(103)* see the original French pages
Fig. 476. *Steinseng.* Burin of the type of polyhedral burins. Flint. (1/1).
Fig. 477. *Steinseng.* Burin of the type of polyhedral burins. Flint. (1/1).
Fig. 478. *Steinseng.* Flake from the manufacture of burins. Flint. (1/1).
Fig. 479. *Steinseng.* Blade with marginal retouching on the lower side. Flint. (1/1).
Fig. 480–482. *Steinseng.* Blades with curved backs, Châtelperron type. Flint. (1/1).
Fig. 483. *Steinseng.* Cut flake pointed on both sides, sharpener and burin (to the left in figure a). (1/1).
Fig. 484. *Steinseng.* Point on the back like the points of Abri-Audi. Quartz. (1/1).

Plate CIV. *(104)* see the original French pages
Fig. 485–488. *Steinseng.* Lateral points retouched on one side, like the points of Abri-Audi. Quartz and flint. (1/1).
Fig. 489–490. Steinseng. Small tanged blades, with curved backs. Flint. (1/1).
Fig. 491– 492. Steinseng. Blades with tangs provided by retouching on the lower face. Flint. (1/1).
Fig. 493–494. Steinseng. Tanged points of the Lyngby point type. Flint. (1/1).
Fig. 495. *Isnestofta.* Blade with oblique truncation at both ends. Quartzite. (1/1).